INSIDE: SYLLABUS FALL2003 CONFERENCE INFORMATION

Syllabus

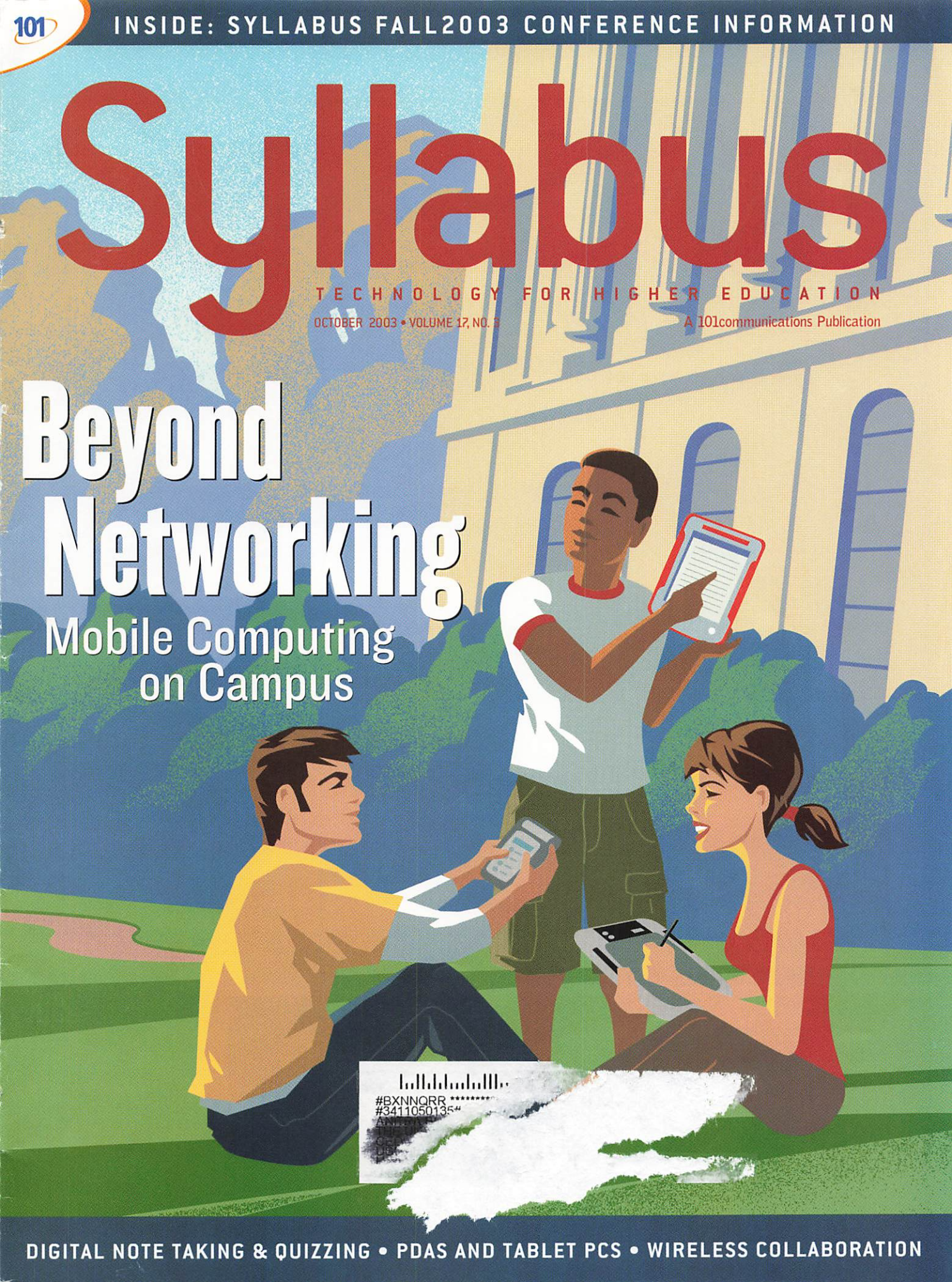
TECHNOLOGY FOR HIGHER EDUCATION

OCTOBER 2003 • VOLUME 17, NO. 3

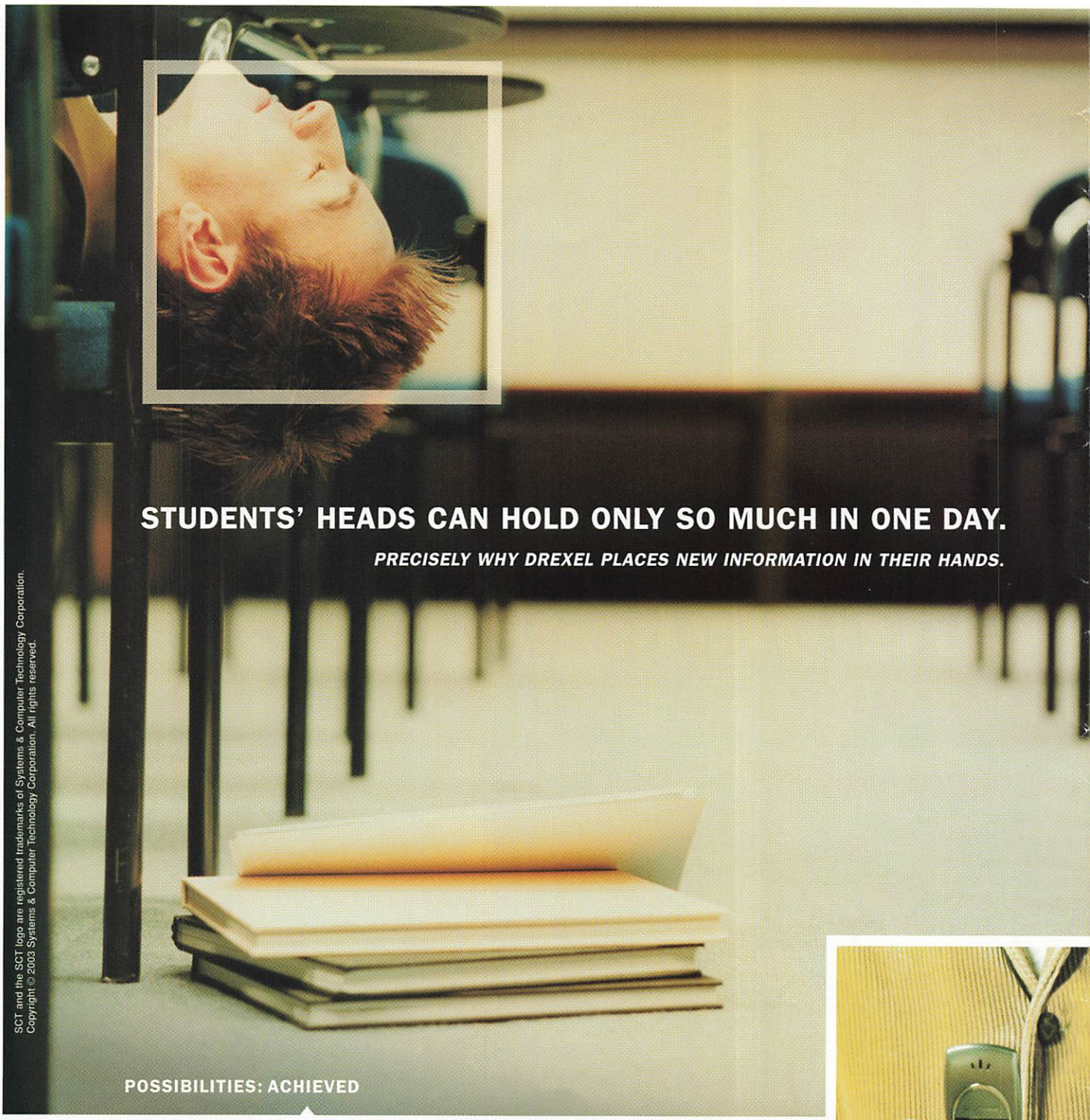
A 101communications Publication

Beyond Networking

Mobile Computing on Campus



DIGITAL NOTE TAKING & QUIZZING • PDAS AND TABLET PCS • WIRELESS COLLABORATION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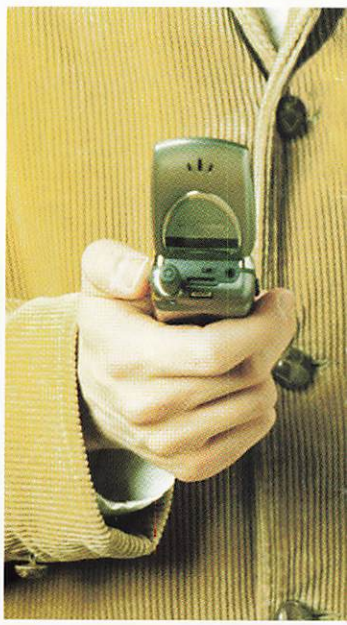

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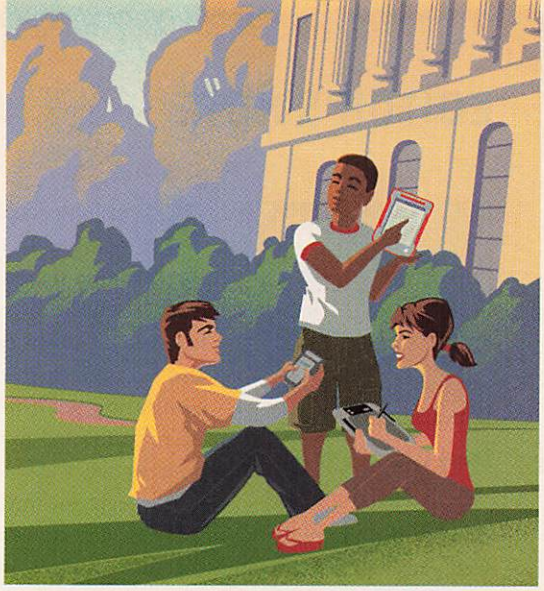

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Every summer, high in the Colorado Rockies, directors and other executives in higher education IT gather to share their latest concerns and strategies at the Seminars in Academic Computing, an EDUCAUSE affiliate conference. Judith Boettcher, a 15-year veteran of this Snowmass, Colorado-based meeting reports on this year's discussions.

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EDITOR'S NOTE

Mary Grush, Editor

Not long ago, being connected to the network meant being able to access files on a server along with some shared resources through a wired connection. And we could do e-mail and access remote sites on the Internet. That was exciting. But now, with wireless coverage and a range of devices designed for mobile networked computing environments, we are more than networked. We're connected to our working environments and to each other in new ways.

Carnegie Mellon University was among the first institutions to test the potential of wireless and mobile computing. Nearly a decade ago, their well-publicized experiments with wearable computing devices and eyepieces seemed incredibly futuristic. In many ways, they still do. But now, given our day-to-day experience with wireless laptop connections, cell phones, and PDAs, the world of untethered, ubiquitous, distributed personal computing seems so much closer. We talked with Carnegie Mellon's director of network services, Charles Bartel (page 10), about the university's unique history with mobile and wireless computing and how these technologies, combined with new applications like location-aware capabilities and speech-to-text translation might change how students work and interact collaboratively.

The form factors of popular mobile devices may change in the future, but those receiving top billing today include notebooks, Tablet PCs, and PDAs. Each of these devices has been successfully employed in classroom instruction. In this issue, we highlight two applications that have real pedagogical implications. At the University of Texas-El Paso, computer science faculty member Nigel Ward and his students are testing the use of Tablet PCs for digital note taking (page 19). Imagine being able to download selected segments of your professor's PowerPoint presentation during a lecture, perhaps capture some of his or her speech, and later search on a phrase to find a particular hand-written note quickly. And at Purdue University, instructors have added the convenience and appeal of wireless PDAs to large lecture courses, using them for quizzing, connected to WebCT's testing engine. Scott Robert Homan and Kevin Wood describe the study they conducted on their application of wireless PDAs (page 23).

In the future, our personal computing will become even more distributed, with a combination of smaller, unobtrusive, integrated devices and seamless wireless connectivity. Greater bandwidth and wireless connection speeds may produce much better audio and video data streaming and more natural, intuitive interaction and collaboration. Eventually, those 1994 student test subjects at Carnegie Mellon, with their wearable computer headgear and eyepieces, will look like antiques. Maybe sooner than we think.

Be sure to register soon for Syllabus fall2003, our fifth annual Boston-area conference, to be held in Cambridge, Mass., December 8-10. We're excited about our program, which includes keynoters William J. Mitchell of MIT, president Graham Spanier of Penn State, and our own Reflections columnist from Princeton, Howard Strauss. You can find basic conference information and a registration form on page 15, or browse the full program and register online at www.syllabus.com. I hope to see you there.

Enjoy this issue of *Syllabus!*

Mary Grush

Letters to the editor should be addressed to the editor and sent to 101 First Street, #605, Los Altos, CA 94022, or via electronic mail (mgrush@syllabus.com). We reserve the right to edit all submissions. **News and product information** will be considered for publication. Please send all materials to Paul McCloskey. If you are interested in writing for *Syllabus*, please send a brief description of your article idea along with writing samples to the editor at the above address.

Syllabus
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Phillip D. Long

TRENDS

AN INFORMATION RESOURCE OF INTEREST TO EDUCATORS

TrackBack: Where Blogs Learn Their Place

BRIEFS

- **Case Western Reserve University** opened 1,230 wireless access points, providing free Internet access to faculty, students, staff and visitors. It is part of a OneCleveland plan to blanket the city with free wireless Internet access.
- A Chinese government-owned bookstore chain placed a order with a Canadian textbook publisher for a million dollars' worth of IT textbooks.
- **RateMyProfessors.com** posted its one-millionth college professor rating.
- A federal jury found Microsoft guilty of improperly using technology owned by the **University of California** in its Internet Explorer browser.
- **AIU Online**, a for-profit university, is offering secure electronic signature capabilities on all legal documents required for students.

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Blogging is becoming the source for millisecond currency on the Web. When the news that Google had decided to buy Pyra Labs, the company that pioneered some of the earliest blogging software, was announced, it was reported essentially live on the SiliconValley.com blog of Dan Gillmor who was sitting in the audience with his laptop connected to his blog site. Communication in Internet time keeps getting shorter.

Since then blogging has become a standard tool for faculty, students, and just about anyone who wishes to publish their thoughts worldwide. Interaction, the ability to comment on posts of others, was a feature of the earliest blogging tools. While commenting on the postings of others facilitates a certain amount of communication, the threshold to form communities is still far too high. The individual publishing paradigm of the blog has taken a turn toward community.

TrackBack

Eons ago in the blogsphere, let's see, that would be about August of 2002, the good people at the company Movable Type released a new protocol. The protocol is based on REpresentational State Transfer, a phrase describing the essence of the Web's architectural style (see http://internet.conveyor.com/RESTwiki/moin.cgi/RestArchitecturalStyle for more information). The idea of TrackBack is to "push" communication between posts made on different Weblogs. Here's how it works.

Someone, let's say Tom, has written a post on his own Weblog that comments on a post in another person's Weblog, say Paula's. How does Paula know or learn about Tom's interest and reference to her post? Tom could have gone to Paula's Weblog and posted a note there saying he liked Paula's comment and wrote about it on his blog at http://toms_log.myblog.com. However, this takes an extra degree of effort, and is just the sort of communication barrier that keeps like-minded people from forming communities. What is needed is a form of remote comment—rather than posting the comment directly on Paula's Weblog, Tom posts his comment about what Paula has written on his own Weblog, then he sends a TrackBack ping to notify Paula.

A TrackBack ping is blogspeak for a short message sent from one Web server to another.

What does this accomplish? Paula can now list all the sites that have referenced her erudite prose on her Web site. This lets those browsing her Weblog read all the reactions to her posting from wherever they were written and posted around the Web. Among those listed, of course, would be Tom's. Because this information is in machine-readable format (the ping message), software tools can read them and draw the Web of interaction around this particular posted topic automatically. The point of all this is to make explicit the connections between ideas (postings) and minimize the effort a browsing member of the blogging community has to expend—

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Movable Type TrackBack for Beginners - www.movabletype.org/trackback/beginners/

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What is TrackBack? - www.muhajabah.com/islamicblog/what-is-tb.htm

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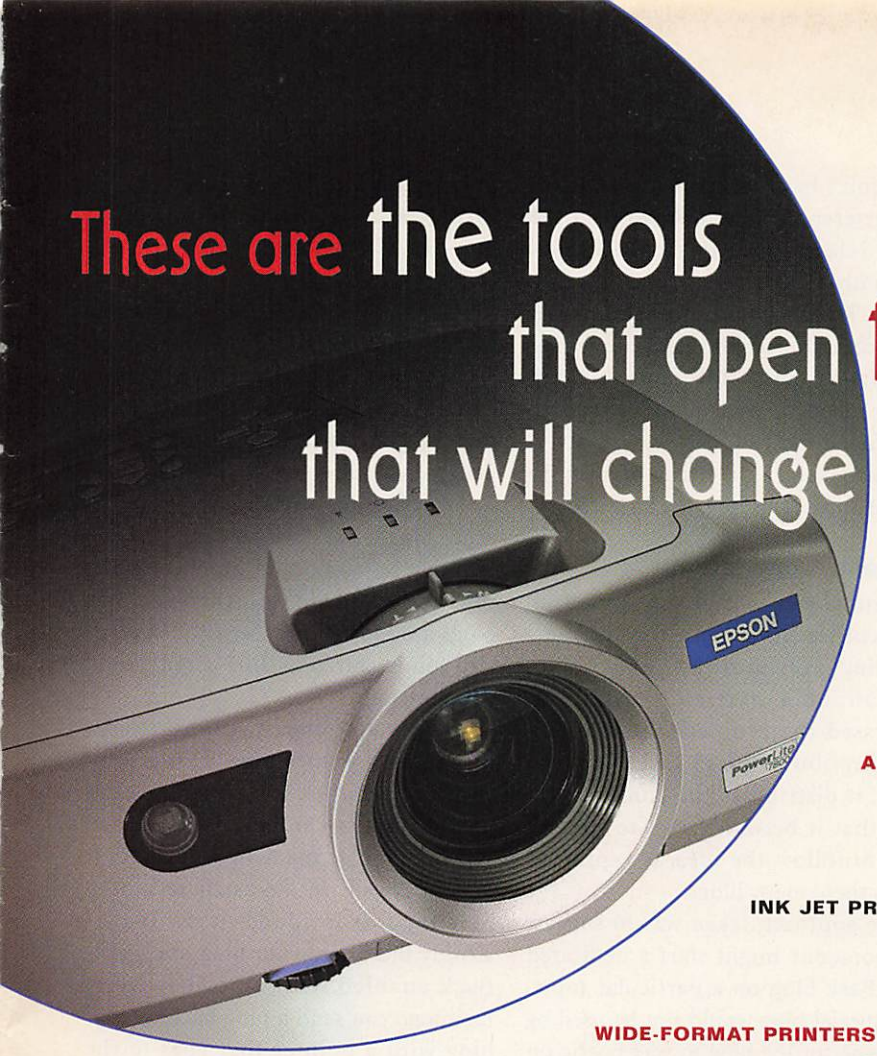

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they don't have to explicitly click on each referenced blog URL to read the set of related postings about Paula's expository prose.

The TrackBack protocol is an open set of communication rules, thus letting vendors of many different blogging engines develop their piece of comparable functionality.

TrackBack, as a form of remote commenting, is just the tip of the iceberg.

Content Aggregation

The initial purpose of the TrackBack protocol was to provide a way of aggregating posts made by various bloggers about a particular topic. It addressed the problem that while a proliferation of blogs gives voice to many, it distributes the conversation such that it becomes next to impossible to follow the idea as expressed across these many blogs.

The approach taken was to suggest that someone might start a dedicated TrackBack blog on a particular topic. This special blog would not be used by the owner of the blog to wax poetic on topics of his or her choice, but become a repository dedicated to a single topic. For example, imagine a site, which collects Weblog posts about the Civil War. Anyone interested in reading about the Civil War could look at this site to keep updated on what other Webloggers were saying about the Civil War, see photographs from that period in magazines, etc. This is accomplished when those who do write on their individual blogs about the civil war initiate a TrackBack ping to the designated collector site.

It's pretty clear that discipline-based TrackBack blogs might turn out to be particularly interesting. What other ways might it valuable?

• If you're running a conference or other event, a TrackBack blog about the conference might collect what people around the blogsphere are saying about it. (Sometimes anonymity can be good). There are some rather, ah, unique uses, as well.

• Post on a blog the current song playing on a different PC's copy of WinAMP, the MP3 player (see http://a.wholelottanothing.org/archives.blah/006625).

• Then again, there's the implementation of TrackBack from WAP enabled mobile phones (see www.virtuelvis.com/archives/71.html). It's not clear that this one has much in the way of pedagogical value, but it's interesting.

• A collection of your posts made on other blogs—the idea here is to have a blog that is a collection of all the postings you've made on other people's blogs around the net (see http://unraveled.com/archives/2003/06/about_posted_elsewhere).

• Active updating of postings from a news database: memingo. This is a bit complicated, but it's an interesting idea. This site can be set up to read postings you've made to your blog. If it's not already in the database kept at memingo, it is added to it. If it is already there, and your blog has TrackBack enabled with auto-discovery, memingo can send a ping back to your blog with a pointer that goes to the metadata about the article (see www.memigo.com/).

The possibilities for TrackBack are only starting to be tapped. What's clear is simple tools can make a large difference in crossing the barrier between splendid isolation and true conversation on the Web.

In an analysis of Usenet News only a small percentage of the users of Usenet actually post content into it. The rest simply take advantage, and yet by most measures, Usenet is very popular. The key is to achieve a threshold of perceived activity that makes the reader sense the site is worthwhile.

Tools like TrackBack extend the blogs by providing markers between sites that can facilitate the creation of community. Retaining community in the electronic fog is a pretty good goal.

Phil Long, Ph.D. *(longpd@mindspring.com) is senior strategist for the Academic Computing Enterprise at MIT. He is also a senior associate for the TLT Group of the AAHE.*

>**10:45 pm.** To provide more answers to more technology questions, CDW•G account manager Nora Weeks engages in her own form of homework.

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The wireless networks that connect us are becoming more pervasive, and digitized information can be accessed by a wide range of mobile devices. Here, Syllabus talks with Charles R. Bartel, Carnegie Mellon University's director of network services and project director for Wireless Andrew about the university's groundbreaking work with mobile and wireless technologies.

Beyond Networking: Mobile Computing On Campus

A CONVERSATION WITH CHARLES R. BARTEL

SYLLABUS: I'd like to speak with you today about mobile and wireless technologies and their impact on the higher education campus. Carnegie Mellon was among the first institutions to install wireless networks. When did the university begin providing wireless connectivity and how has it grown on your campus?

CHARLES R. BARTEL: We actually began with wireless in 1994, primarily as an experimental project for researchers and a limited number of educators. We had received a grant from the National Science Foundation to support a number of researchers who had gotten similar grants for mobile and wearable computing. This was all pre-IEEE 802.11 radio deployment. We had wireless in about five buildings on campus, and had deployed about 75 access points for roughly 150 users.

Then in 1998, when the original IEEE 802.11 specification came out, we partnered with Lucent Technologies, the provider of the pre-specification equipment. They had learned a lot about deploying wide-scale wireless LANs and wanted to look at how that would be done in the standards space. So, they granted us 400 access points to refresh and expand in the academic campus. In 1998-2000, we deployed a production wireless network in 30 buildings, covering almost 3 million square feet with roughly 350 access points. And in 2001, we expanded the network into our resident housing space, which added another 30 buildings and another million square feet of interior space. So today, with the Wi-Fi network we call Wireless Andrew, we have about 4 million square feet of interior space and we've covered almost 100 percent of the campus—roughly 105 acres, both inside and out, with 802.11b, at about 11 megabit speeds.

S: So Carnegie Mellon has ubiquitous wireless coverage, then?

CRB: Yes, since Fall 2001.

S: How do faculty and students use wireless today on your campus? Are they fairly mobile users of technology?

CRB: Yes. There's a range of uses, as you might expect, from more standard things, such as e-mail, Web browsing,

downloads, and instant messaging, to some of the more experimental applications like proximity-aware and location-based capabilities, using handhelds and PDAs. And we're starting to experiment a little more with Tablet PCs.

S: What were some of the original research applications and uses of wireless for the mobility researchers?
CRB: There were projects with robots, wearable computers, and experimentation with integrating eye pieces and using different form factors of computers that can provide information.

S: Could you tell me a little bit more about the wearable devices—what those are like, and what are some potential applications?
CRB: There are many examples, some of which you can see at www.wearable-group.org. A part of our engineering school, IECS (Institute for Complex Engineered Systems) looks at a number of applied problems. For example, people that do any level of maintenance on very large items—in the military you may be talking about a tank—may have to refer to multiple books the size of a NYC telephone book with schematics and blowout diagrams of all the parts. With a wearable computer, people can maneuver around, physically, and still have access to a wealth of information through downloads or the wireless connection to their wearable device. Another example is our research into using a universal translator for speech-to-text or text-to-speech translation of foreign languages.

S: Would the speech-to-text technology have any application in the classroom, say in terms of note taking?
CRB: That is a potential, as what you could be looking at is the ability to capture, in real time, what the lecturer is saying, in addition to having access to what might be a PowerPoint slide or a Web page of notes or things like that, and also being able to capture some of the real time interaction between a student and a faculty member as they are going through a problem or discussing a particular area. A project called Informedia, led by Dr. Howard Watclar, has been pursuing research and development in this area for many years at Carnegie Mellon. [see www.informedia.cs.cmu.edu/]

S: Is there anyone on campus doing research into the pedagogical implications of mobile computing?
CRB: There is, particularly in marrying the use of handheld devices with wireless communications capabilities in the classroom. We have a professor by the name of David Yaron, who teaches a modern chemistry class. For those of us who have taken chemistry, we know that some learn and understand it pretty easily, and others, like myself, just don't get it as easily. Sometimes concepts need to be presented in a multitude of ways in order to gain an insight. Prior to using handhelds, Yaron used to pass out numbered index cards, and periodically take a poll during lectures as to the level of understanding of the material just

Illustrated by Perry Brown

presented. If he saw a vast majority of "1s" held up, he knew that the class got it. But, there would still be some concern about the reliability of the poll—who wants to be the one holding up a "4"? Now, using handhelds, the poll can be answered somewhat anonymously, and tabulated as well. [see www-2.cs.cmu.edu/~pebbles/classroom/index.html]

The variant on that is that you can give ungraded pop quizzes to get at the same information. Could you do all that in a wired classroom with a wired keypad? Absolutely. But if you have a campus-wide wireless infrastructure and students with handheld computers, you can set this up in any classroom, not just in the few you have wired with keypads.

S: I'd think particularly if the students are bringing their own PDAs, they could have their own profiles and keep some data about themselves, too.

CRB: Absolutely.

S: What's going on in terms of location-based experiments?

CRB: Some of these experiments have been done a couple of years back, but our purpose is to see if there are some new and interesting ways of doing things. One example is that we had a graduate engineering course that was working on a typical problem that students face when working in collaborative teams. They may be in a number of different teams with all different team members. And everyone probably has a different schedule, so getting together to work may be a hard thing to schedule. But, we can alleviate this somewhat with the use of handhelds and some collaborative software. Let's say that you have a project team. There is one student who has been delayed. The team is able, through location-aware information, to triangulate on the person's whereabouts and instant message them via the handheld, letting them know that the meeting is going ahead, and where it is. And through some collaborative whiteboard software and the mobile student's and the team's handhelds, they can actually conduct the meeting while the late comer is in transit, and have a fair amount of that information beamed to that person. They won't have to restart the meeting or recap and have that inefficiency occur. You might actually even ask that person to pick up a remote printout or perhaps a resource at the library, while they are on their way, then have them rejoin the team at some point. So that was one experiment that was done in the engineering school. The various pieces of collaboration software and the location-based triangulation and location-aware applications were developed as part of the course. [see www-2.cs.cmu.edu/~wearable/class/spring2000/index.html]

S: Has there been anything done with proximity-based technology in terms of campus information, where the location itself can push out useful information to willing recipients?

CRB: Yes, actually there is a company called Pango Networks, which is based in Pittsburgh, and we've piloted some of their proximity-based or location-aware technology on our campus, with our admissions staff. Many campus tours are done with present students acting as tour guides, and while they may do an excellent job, a lot of the information they convey is based on their own experience on the campus. The notion with Pango was to build up a database of information pertinent to various schools and buildings, so that when the tours walk around campus and approach a particular building, they can get information about what departments are inside. They could identify the faculty and their locations, and find out about their specializations. All this is done as Hypertext links. The advantage is having the device understand where you are by triangulation, on the wireless network, and beam you appropriate information.

A variant of proximity-based technology that we've been doing some research on is an application called Restaurant Concierge. Now this might seem a little bit contrived, but all these experiments are made to test the feasibility of the technology and how you might apply it further. Let's say, if you are familiar with the campus at all, you might know the location of a number of eateries on campus. And your PDA probably has your calendar and schedule. What Restaurant Concierge does is to take all of the information in your environment, act as an agent, try to make some intelligent choices for you, and suggest things for you. For example, it's aware that it's now winter in Pittsburgh—and it may advise you that, while you have plenty of time on your calendar, you might not want to walk halfway across campus, and there are a couple of eateries within a five-minute walk of your present location. And BTW, here are the names of two of your friends who are currently at one of the restaurants. [see www-2.cs.cmu.edu/~sadeh/mycampus.htm]

S: What kinds of mobile devices are most prominently in use by the general student population at Carnegie Mellon?

CRB: I would say that today, laptops are the vast majority. PDAs are probably coming up in numbers, and Tablets are probably in a third place at this point. But I think that still has to do with people trying to decide what is the right form factor for them to use. So, most students are going with a more traditional laptop, but as the power and flexibility increases with handhelds, and as you are looking at Tablets maturing more and more, I think that both of those are going to become viable competitors.

S: Which of the current mobile devices

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that we see in some use today—laptops, PDAs, or Tablet PCs—do you think will have the most acceptance or application in the future?

CRB: That's hard to say. The handhelds are very interesting from the point of view of offering a small, light, increasingly powerful form factor, and have sort of an "instant on" capability. In terms of writing, the Tablets show us more of a socially accepted kind of behavior, allowing people to engage a little bit more than a laptop might permit. It's not quite clear how the human factors of these mobile devices will eventually play out. At Carnegie Mellon, we are very concerned to study the impact of the various devices on education rather than merely seeing what develops. For this reason, we currently are starting a study on the use of laptops in undergraduate architecture classes to see if ubiquitous laptop access on a wireless network really had an educational impact or not.

S: What are the expectations of Carnegie Mellon students for wireless connectivity? Do they come to the university demanding ubiquitous wireless connectivity, including for residence halls, classrooms, and public areas? Do you think that students in colleges and universities in general in the U.S. will be expecting that kind of wireless connectivity at their institutions soon?

CRB: At Carnegie Mellon, because it is there, it is expected. It's for the most part now an accepted utility. When it is not there—a failure of wireless hardware, for example—we hear about it. Now in terms of other colleges and universities, when I've given talks and presentations with my peers one of the things that I tell them is that wireless is going to show up on your campus. Either you as the campus professionals are going to deploy it, or the students, faculty, and staff are going to bring it and deploy it themselves. We are now looking at being able to go to the local electronics store and for a couple hundred dollars being able to buy an access point that we were buying a functional equivalent of for $1,500 maybe four or five years ago. This technology has now become very cheap, and wireless is also more common in homes. Students expect to see on campus what is in their homes. If it is not in the university, people will start wondering about the credibility of the institution. That may sound strong, but that's how it's turning out.

S: In general, do you think that mobile technologies will contribute to changes in models of instruction? For example, might greater mobility foster different kinds of class meetings and support collaborative work?

CRB: Yes, absolutely. With mobile devices seamlessly connected to the Internet and the campus intranet, and as people become more comfortable with the technology, they are going to find new ways of presenting their material, and take advantage of the flexibility.

S: In the next few years, what important trend might we see in wireless technologies in higher education environments?

CRB: It's very hard to predict the future. As wireless continues to grow, and we can put more information down a wireless pipe, so to speak, I think we are going to see the applications become a little bit more media rich. So whereas now we may be talking about downloading Web pages, soon we may be able to do something more along the lines of animations and streaming video.

S: What are the implications for the convergence of telephony and wireless networks?

CRB: Telephony has some of its own interesting requirements, as does video. Most data, particularly with IP protocols, are more accepting of latency than audio or video. If the packet doesn't get through, there is the provision for doing some retransmission. Voice communications—like video—is not as forgiving in terms of latency. So, what you are going to have to see for telephony to really take off in the realm of wireless is more robust quality of service types of implementations. And those are things that are being worked on by the IEEE now and will be eventually incorporated into the existing wireless standards. So I think that you are going to see VoIP, Internet telephony, or whatever you are going to call it occurring in wireless technology. But you are probably going to be seeing that a little later than on the wired side.

S: Carnegie Mellon is an urban campus. What special opportunities does that present—with museums around and different sorts of cultural resources you can connect to in the community?

CRB: There are real opportunities. For example, adjacent to our campus there is a field left from an old baseball stadium that was torn down maybe 30+ years ago. University of Pittsburgh and the Carnegie Museum and Library are also in that vicinity. There is now some amount of interest in making that a green park space, covered with wireless to make it interesting for the community in general.

S: At Carnegie Mellon, you've been consistently in the forefront in your wireless networking and in offering the potential for mobile work environments to your students and faculty. How will you extend this? What will you do next?

CRB: Because we are in the forefront, the technology we deployed early is going to need a revamp. So we are looking at the next generations of what are currently the ratified standards of 11a and 11g. And we're looking at how we can put in a composite wireless design that can both serve the high-bandwidth needs, perhaps via an 11a infrastructure, and still support what you might call the legacy users of b and g.

We'll also be figuring out ways of taking advantage of the emerging area of hot spots so that a campus community user can interconnect in a reasonably secure and authenticated way back to the campus, riding on, as seamlessly as they can, whatever radio LAN may be floating around where they are. There are different models for that, and right now we are looking to find the best way of integrating those, to meet future demands for seamless wireless connectivity.

We'll keep looking into the best uses of mobile and wireless technologies.

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Today's interactive media are allowing educators the flexibility to offer new modes of teaching and collaborative learning. See how these technologies are being used in the classroom, the lab, and for distance education, and learn more about the enabling technologies and standards like SMIL and XML that help to make it all possible

IT Implementation and Support

Evaluation and support strategies are central to the success of ePortfolio initiatives, distance learning programs, and other implementations of technology on campus. Find out what institutions are doing to support faculty development, evaluate technology programs, provide help desk services, and offer resources for technology integration.

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Strategic planning may involve a myriad of challenges, from infrastructure issues, to accreditation of distance learning programs, to section 508 compliance. Concerns may include how to determine return on technology investment, or how to leverage technology to benefit large non-major sections.

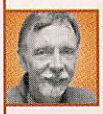
Teaching with Technology

This track offers a faculty view of the intersection of technology and pedagogy. Join colleagues as they present case studies in their disciplines and explore relevant topics, including instructional design standards, academic integrity, technology and student learning, and more.

Seminars

XML in Education

Frank Coyle, Ph.D. – Director, Software Engineering Program, Southern Methodist University



Explore the origins and structure of XML and the family of support technologies that make applications possible. We'll look at how Cascading Style Sheets (CSS), XHTML, SVG, and VoiceXML open up options for delivering XML to a variety of devices in different formats. We'll also contrast and compare DTDs and XML Schema and explore new developments in XML support technology. The session will wrap up with a look at Synchronized Multimedia Integration Language which brings sophisticated multimedia presentations into the hands of educators. Attendees will come away with a broad perspective of how XML-related standards work together to enable the delivery of real-world XML-based applications.

An Introduction to Macromedia Flash MX

Tom Hall – Trainer, Software Developer/Consultant

Macromedia Flash MX is the solution for developing highly visual interactive content and applications for the Web. This tool provides one of the quickest ways of adding animation to a Web page but also can be used to create very high quality Web content. This seminar will provide the following: Product Overview, Product Resources, Product Showcase, and a behind-the-scenes look at how to use Flash MX. You will also learn about the Flash development environment and be shown how to create a variety of different animations using Flash MX. You will be introduced to ActionScript, the powerful programming environment available in Flash MX, and you will learn about Libraries, Learning Interaction Objects, and Components.

Featured Speakers

New Learning Spaces: Back to the Future

William J. Mitchell – Dean, MIT School of Architecture and Planning and Head of the Media Arts and Sciences Program, MIT Media Laboratory

Over the last decade or so, many colleges and universities have built specialized, high-tech labs and classrooms that provide and showcase the latest in learning technology. In this presentation, Dean Mitchell will argue that this is precisely the wrong strategy, propose an alternative, and illustrate this alternative with practical examples. As digital technology becomes ubiquitous, it can disappear into the woodwork. Without sacrificing connectivity or functionality, learning spaces can now be built around responding to basic human needs rather than responding to the requirements of specialized and delicate machines.

A Conversation About Higher Education and IT

Graham Spanier, Ph.D. – President, Penn State University

Graham Spanier will offer his perspective of technology integration at a major research and teaching university. A true technology president, Dr. Spanier has guided Penn State through eight years of far-reaching technology change on campus, including the establishment of Penn State World Campus, the university's distance education initiative, and a new School of Information Sciences and Technology. He will discuss trends connecting education and IT, issues surrounding the management of information technology in higher education, and how to use IT to create more student-centered universities.

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Instructional Design in the Web Space

Judith V. Boettcher, Ph.D. – Consultant, Designing for Learning

This seminar is an opportunity for faculty, faculty support personnel, and administrators to explore the key issues, technology tools, and processes for designing and delivering online and distance learning programs. The key processes include developing a framework for design, exploring core learning principles, and identifying the steps in preparing courses and learning experiences for the Web and online virtual spaces. Some of the key issues include managing administrative challenges of costs, time, and infrastructure needs for online learning such as faculty workload, training, and course development strategies.

"Syllabus Conference is a rich gathering of higher-ed professionals who are seeking the best applications of technology for teaching and learning. The Keynote speakers challenged us to think creatively about the tools. The breakout sessions provided wonderful opportunities to learn ...."

– Karla Vogel, Director, Audience Computing, UNHC Manchester

Increasing Institutional Productivity with a Technology Enabled Faculty

David Starrett – Associate Professor of Biology, Southeast Missouri State University

Michael Rodgers – Associate Professor of Chemistry, Southeast Missouri State

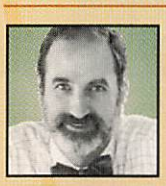
Colleges and universities worldwide have invested enormous resources in computer technology for teaching and learning. Incongruities between available resources and existing faculty technology skills are partly to blame for technology's failure to produce large gains in student learning. This seminar examines the relationship between productivity and institutional goals, along with the impact of technology on both educational and economic productivity in the academic setting. In a time of declining resources, enhancements to faculty productivity can make a compelling argument for continued instructional technology investment. Participants will explore faculty development as a means of leveraging the potential of technology to improve productivity.

Teaching and Learning Technologies in the Year 2015

Howard Strauss – Manager of Technology Strategy and Outreach, Princeton University

Howard Strauss will explore some current technology trends and project their implications for colleges and universities. By pondering the future of authentication, portals, course management systems, and smart classrooms, you'll be better prepared for the next big things in technology.

Knowledge Transactions: Digital Technologies and Change



Blogging, ePortfolios, and learning objects are among the technologies indicating changes in the way information is created, managed, and exchanged on campus. How will digital technology change basic knowledge transactions for higher education?

Moderator: *Frank Tansey, Ph.D. – Student Friendly Services*
Panelists: *Trent Batson – Director, Information and Instructional Technology Service, University of Rhode Island*
Steven R. Acker, Ph.D. – Director, Learning Technologies Research and Innovation (TELR/CIO), and Associate Professor of Journalism and Communication, The Ohio State University
Sarah Roberts – IT Analyst and Supervisor, Multimedia Project Studio, Office of Information Technology, Duke University

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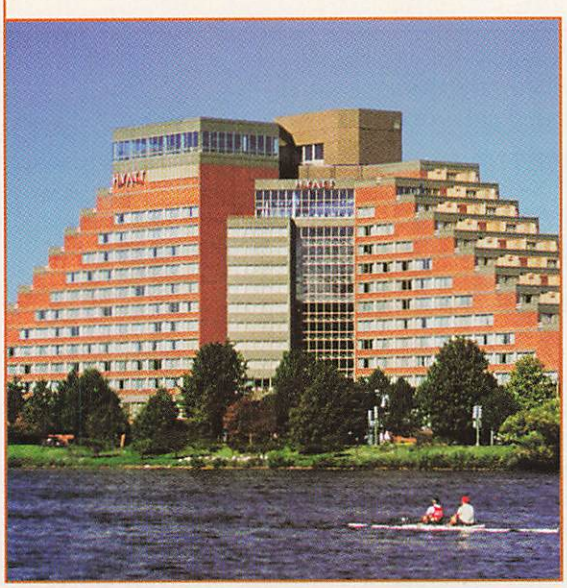

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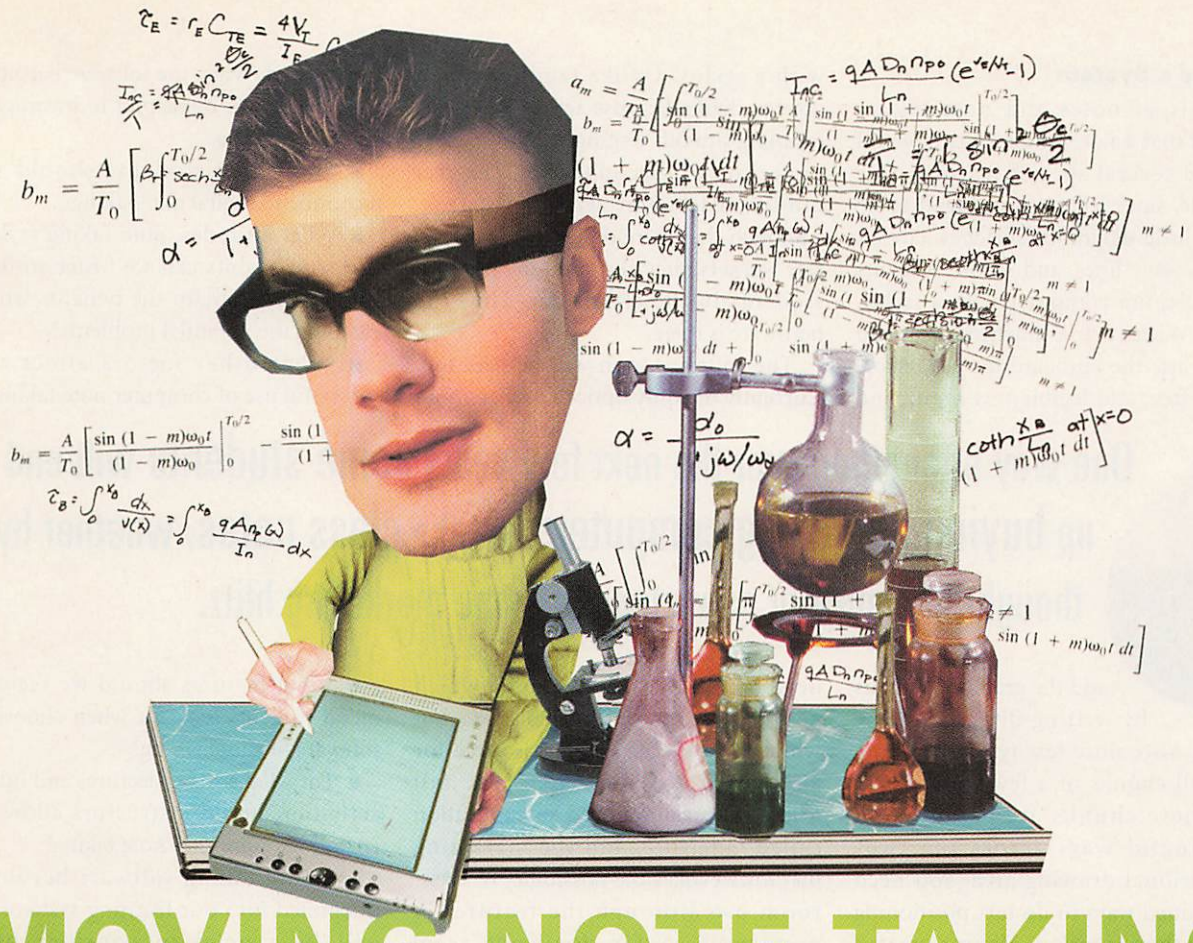

MOVING NOTE TAKING INTO THE DIGITAL AGE

For evey student, note taking is a necessity. For some, that may be easier than for others. But in any case, mobile technologies have the potential to change the process dramatically—especially when specific note taking software is developed for the Tablet PC. **By Nigel Ward, University of Texas at El Paso**

The night before the final, did you ever discover that your class notes had become illegible? In Chemistry lab, did you ever search tediously through your notes from last semester to try finding one specific formula? Did you ever want to interpolate some extra information into your notes, without having to re-copy an entire page? These problems never occur for theses, reports, manuals, letters, and the like today, because those documents are now all digital. Digital documents are legible, searchable, and editable. But class notes are still overwhelmingly produced the old-fashioned way, with paper and pencil.

Thus my new student, Hajime Tatsukawa, made the case for doing his thesis on a system to enable students to take class notes with the computer. The idea of using technology to empower students was, to me, novel, in contrast to the mainstream inspirations for applications of technology to education, which seem to offer mostly course management and enhanced lecturing capabilities for instructors.

My immediate response was, however, to point out that paper is a superior technology for this task. Lecture notes, unlike most kinds of documents, are produced under extreme and inflexible time constraints. You have to get down the important things fast, before the lecturer goes on to the next topic. Producing lecture notes with a computer is not difficult, but doing so fast enough is a problem; in fact we found that using the computer took twice as long as pencil and paper for typical lecture notes. But Hajime thought that this was fixable, and set to work building a system for taking notes.

Illustrated by Tom Nick Cocotos

Hajime's System

Analysis of notes and note taking showed that a note taking system would require several special features. For example, since lecture notes tend to be full of little diagrams, sketches, circles, arrows, wavy lines, and so on, students need a laptop computer with a stylus. With such a machine, you can use the keyboard for fast, error-free, and legible text input, and add the graphic elements by writing directly on the screen. Also, since text typically occurs in small chunks of a few words each, and these chunks are arranged in meaningful ways across the two-dimensional drawing area, you need streamlined ways to do text positioning and textbox creation. Hajime created a system, written in Java, that does all this and more. [The source code is available at http://www.cs.utep.edu/nigel/notetaker/ for downloading.]

After tests in the laboratory showed a generally positive reaction, we bought four basic pen-equipped laptops and advertised for students to try out the system in their classes. Of these users, two decided they preferred paper, but two liked the digital system, and one of the latter was still using it after two semesters. The factors affecting acceptance seemed to include computer literacy and typing speed. The main problems users noted related to the hardware, notably the temporal and spatial resolution of the pen input.

The Tablets Arrive

A solution for the problem of the resolution of pen input arrived this past November, when Tablet PCs finally became available. These are full-featured PCs that are roughly the size of a pad of paper and which allow PDA-like writing with a stylus. Unlike familiar touch screens, Tablet PCs use active (RF) pens, enabling smooth writing with no jaggies or feeling of disconnection. Several models also come with keyboards. Although they were designed for corporate workers, they also meet the needs of students in the classroom. Thus the hardware is there.

The software soon will be here too. Currently the only option for classroom note taking is Hajime's code, which does not yet run on the Tablet PC, but which is available as open source for anyone to extend. This past fall Microsoft preannounced an application called OneNote, and the marketing literature evokes the possibility of classroom use although the feature set previewed so far does not seem adequate for classroom note taking. But it is probably only a matter of time before other players also release systems that will support taking class notes.

Take Note

One way or another, over the next few years some students will end up buying and using computers to take class notes, whether by thoughtful choice or as victims of a some marketing blitz. However no one knows whether this will encourage more note taking, better note taking, or more efficient note taking. Will digital note taking software help students pay more attention in class or will it be a seductive distraction? Will it foster or weaken in-class collaborative learning and after-class learning communities? On the bottom line, no one knows yet whether digital note taking software will be a waste of time and money or an effective learning tool.

Note taking with computers will probably be neither entirely good or entirely bad. When the software becomes available, it will be helpful to investigate questions such as:

- For which students should we recommend digital note taking?
- What attitudes, note taking styles, and study habits can we foster so that students can obtain the benefits while avoiding the potential problems?
- What other factors affect the successful use of computer note taking?

One way or another, over the next few years some students will end up buying and using computers to take class notes, whether by thoughtful choice or as victims of some marketing blitz.

- What features should we recommend students look for when choosing software for note taking?
- For what sorts of lectures and other activities should instructors allow or encourage computer note taking?

As note taking software becomes integrated into our learning systems, it will be crucial to consider how computer note taking can leverage other technologies, such as distance learning and multimedia, and how it can take best advantage of the wireless classroom and other mobile and collaborative technologies.

Nigel Ward, Ph.D. *(nigel@cs.utep.edu) is an associate professor of computer science at the University of Texas at El Paso.*

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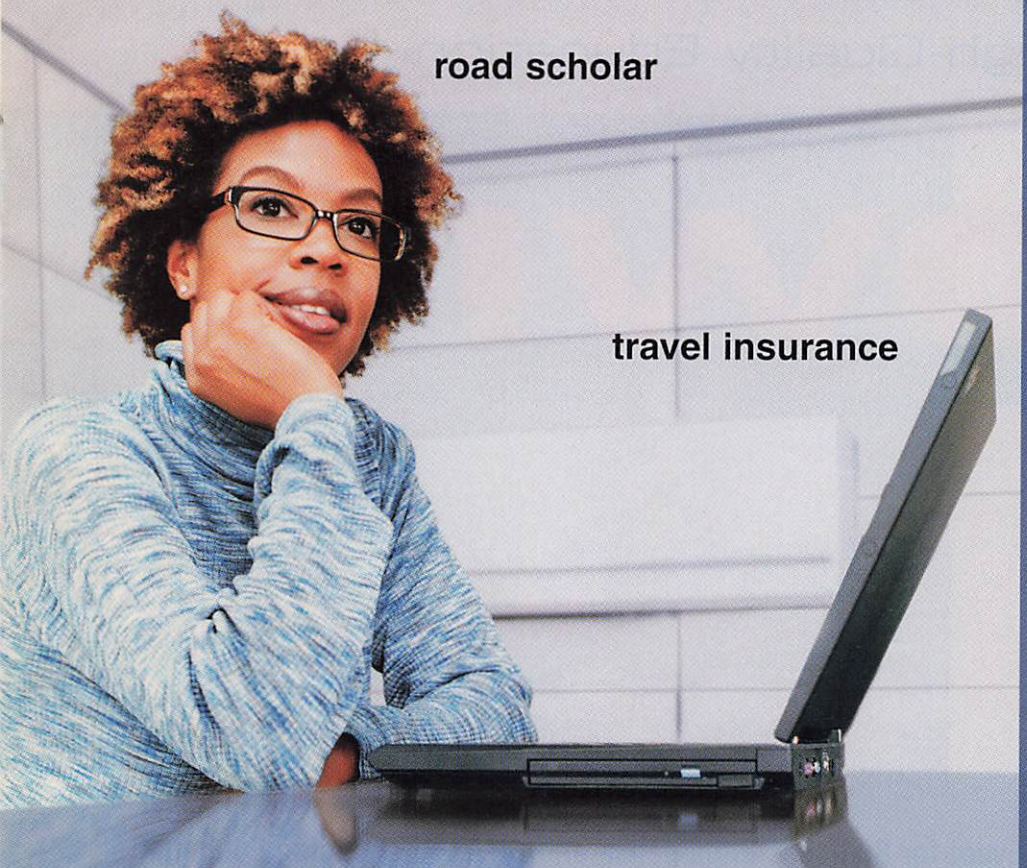

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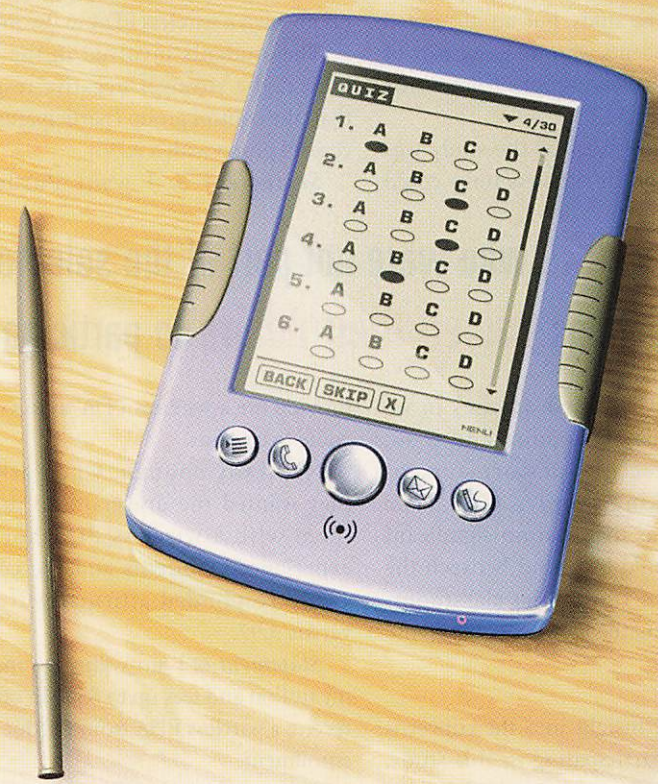
TAMING THE MEGA-LECTURE: WIRELESS QUIZZING

At Purdue University, faculty tested the usability of wireless PDAs for quizzing functions in a large-enrollment course. Linked to WebCT's testing engine, the tiny PDAs offer giant savings in paperwork and a big appeal to students.



Scott Robert Homan and Kevin Wood, Purdue University

Each semester more than 600 students enroll in the Applied Leadership course provided by the Department of Organizational Leadership and Supervision at Purdue's School of Technology. At most schools the course is generally called Introduction to Business. In Fall 2003 the course was taught using three lecturers with four graduate students facilitating 21 recitation sections. The enrollees represented a variety of majors and semester classifications across campus.

Because of the time required to handle the paperwork of such a large enrollment the professor in charge suggested it might be useful if wireless technology could be used to save the costs of duplicating exams and quizzes and maximize Purdue's existing investment in the WebCT course management platform.

In the Spring 2003 semester, Purdue had been in the final stages of installing wireless access in major classroom buildings across campus. At the same time, the school had 35 HP Jornada 560 Series pocket PC available in its inventory. Given this opportunity a feasibility study was done to determine if wireless PDAs could be used to conduct WebCT-based quizzes in the classroom.

When Purdue's information technology services group was initially consulted with the request, the immediate answer was that it is not possible because of WebCT's inability to conform to the unique characteristics of the PDA. Fortunately the IT staff persisted and ultimately arrived at a software solution to enable the PDA to access the WebCT testing engine.

In order to begin the feasibility study many obstacles had to be overcome, including the relocation of the equipment across campus, the identification and approval for use of a

Illustrated by Ryan Etter

secured storage facility, and the preloading of software on the PDAs. The Applied Leadership professor then chose two recitation sections of the class and conducted three weeks of quizzing using the wirelessly configured Pocket PC.

Each student was given the option to select out of the study, but no one opted out. Many students who were not part of the selected wireless sections voiced their desire to participate.

The primary focus of the study was to determine if the wireless units could deliver WebCT-based quizzes in an actual Purdue classroom, and if so, would it effect the performance of students taking quizzes. The basic hypothesis was that that no significant difference would be found between the quiz scores of traditional classrooms and those using the wireless equipment.

"Many students who were not part of the selected wireless sections voiced their desire to participate."

The Survey

To gain more insight into the concerns of students participating in this study, an opinion survey was developed using standard survey construction techniques, including a control group outside the course. Students were asked to respond to a series of statements with a 1-to-5 rating, with 1 representing strong disagreement and 5 representing strong agreement. Below is a summary of the findings:

Statement 1: Overall I have enjoyed using the wireless PDA device to take quizzes in class.

The response was generally positive, with a 3.66 response rate. As the control group did not use the PDAs in any way this question did not apply to them.

Statement 2: I want to use wireless PDAs in more of my classes to take quizzes.

There was a positive response of 3.52, with the control group registering a 3.51—a negligible difference. This seemed to indicate no negative associations for participants using the PDAs.

Statement 3: I want to use wireless PDAs in all of my classes to take quizzes.

The participants responded slightly more negatively than the control group and overall disagreed with this option (participants, 2.89; control group, 2.95).

Statement 4: I am willing to purchase on my own a wireless PDA to use in class.

The students involved in the study indicated a stronger negative response than the control group (participants 2.28; control group with a 2.79).

Statement 5: I want Purdue to provide me a wireless PDA to use once I come to campus.

Naturally enough, when asked if they wanted the university to provide them with a wireless PDA both the experienced students and the control group responded affirmatively: 4.05 versus 3.97.

Statement 6: I am willing to increase my tuition and fees up to $500 in order to receive a wireless PDA from Purdue upon enrollment.

The response was generally negative with the experienced participants indicating a much stronger negative response (participants, 2.52; control group, 2.87).

Statement 7: Overall the wireless PDA is difficult to use.

Participants indicated that the PDA was not difficult to use, but the average response is close to neutral (2.77), possibly indicating that for some it was difficult while for others it was not. For this question the control response (2.31) is particularly interesting because for them it is a hypothetical statement.

Statement 8: The screen size of the PDA is too small for use as a quizzing tool.

Experienced participants indicated an overall affirmative (3.20). The experienced students gave a much stronger response than was found in the control group (2.87).

Statement 9: I use a cellular phone on a regular basis.

This question indicates that both the control group and the experienced participants are cell phone users (4.16 versus 4.36). This question was asked to gauge the technical proficiency of the participants and to determine if they had experience using small screens.

Statement 10: I own wireless computing equipment.

This question indicates that wireless computing equipment is not generally owned by typical Purdue students (participants: 2.89; control group: 2.51).

Statement 11: I use wireless computing equipment at home or where I currently live.

This question indicates that a majority of students do not yet have access to wireless computing in their homes or dorms (participants: 2.80; control group: 2.64).

Statement 12: I consider myself a proficient computer user.

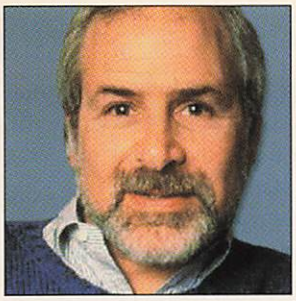
The response indicated a strong correlation between the control group and participants on their assessment of their computer skills. Both groups gave an identical positive response when asked if they consider themselves proficient computer users (4.18).

Outcomes

Generally the wireless PDA units worked in accessing the Purdue WebCT testing engine. About 10 percent of the units consistently failed to connect every time the feasibility study was attempted. The exact nature of the failure was not identifiable but it was most often resolved by giving the student a new PDA.

The study determined that wireless PDAs can be used to administer WebCT-based quizzes but that possible complications must be addressed. It also found that typical college students are agreeable to using wireless technology—but they are not altogether willing to be forced into purchasing the equipment.

Scott Robert Homan, Ph.D. *(srhoman@tech. purdue.edu) is an assistant professor and* ***Kevin Wood*** *(kdw@purdue.edu) is a senior software architect/developer, both at Purdue University.*



Kenneth C. Green

DIGITAL TWEED

Follow the Money

It was some three decades ago, during the Watergate era, that Deep Throat told Washington Post reporter Bob Woodward he had to "follow the money" to understand the scandal. But long before Watergate, public policy professors and analysts knew that money reveals a lot about organizational behavior and institutional priorities.

Following the money that colleges and universities spend on computing and information technology has always been difficult. But years ago, the organization of computing into highly centralized academic and administrative units followed traditional, indeed rigid budget models that offered some opportunity to track core IT expenditures.

Today, however, computing and information technologies are ubiquitous across academe. Engineering and English professors exchange informed opinions about product preferences. Engineering and English departments also purchase lots of their own technology—computers, software, servers, and other stuff—often independent of the traditional "central" campus computing centers.

I've long maintained that we would need a small team of forensic accountants to know just how much any college really spends on computing and information technology. We might also need a team of forensic HR specialists to determine just how many people on campus are doing IT work—ranging from operations and management to systems, security, and user support.

But now we have a new resource from the EDUCAUSE Core Data Service to help us understand more about the structure and complexity of campus IT operations.

EDUCAUSE launched the Core Data Service to collect and provide benchmarking data about IT budgets, staffing, organizational structure, and related issues. The target audience was campus CIOs; indeed, since June, CIOs at institutions participating in the original survey had outside of the U.S., access to the data to create custom reports comparing their institutions to self-selected peer institutions in the Core Data Service database.

But the new EDUCAUSE Core Data Service Summary Report, out this month (www.educause.edu/coredata), presents these data to a larger audience audience—faculty, administrators, policy analysts, researchers, and others outside of campus IT offices who are interested in IT issues on their campuses and across the academic community.

Drawing on data from 561 U.S. colleges and universities and 65 universities outside of the U.S., the core Data Summary Report offers many interesting (and some will say surprising) insights into money and personnel matters affecting campus IT operations. For example, across all sectors of U.S. higher education, personnel expenditures account for about half of the budget of centralized campus IT organizations. In contrast, colleges generally spend about 80 percent of the total campus budget on personnel.

The report reveals that IT budgets vary dramatically across sectors, depending on how the budgets are measured. Research universities spend almost three times more on IT per FTE student than do community colleges. However, and somewhat surprisingly, when IT resources are measured in terms of FTE faculty expenditures, the variability is significantly less, shrinking to about 50 percent more per FTE faculty in research universities than in community colleges.

Another interesting number in the report involves the funding for professional development in IT organizations. Across all sectors, from community colleges to research universities, the FTE professional development expenditures are, as stated in the report, "surprisingly consistent" at about $1,000/FTE.

Less surprising is that the Core Data Report confirms with a number what many have known from experience: A significant portion of campus IT spending comes from the budgets of academic departments and operating units, including research labs. This "independent" money—independent of central IT operations and budgets—ranges from about 30 percent of total campus IT spending in research universities to about 10 percent in community colleges. In other words, academic departments and operating units spend a lot of their own money on information technology resources.

The new report also documents the degree of campus dependence on student workers in IT operations, particularly IT user support. Across all sectors, part-time student employees represent about half of the total FTE support personnel for instructional technology, user support services, and public help desks that serve students, faculty, and staff.

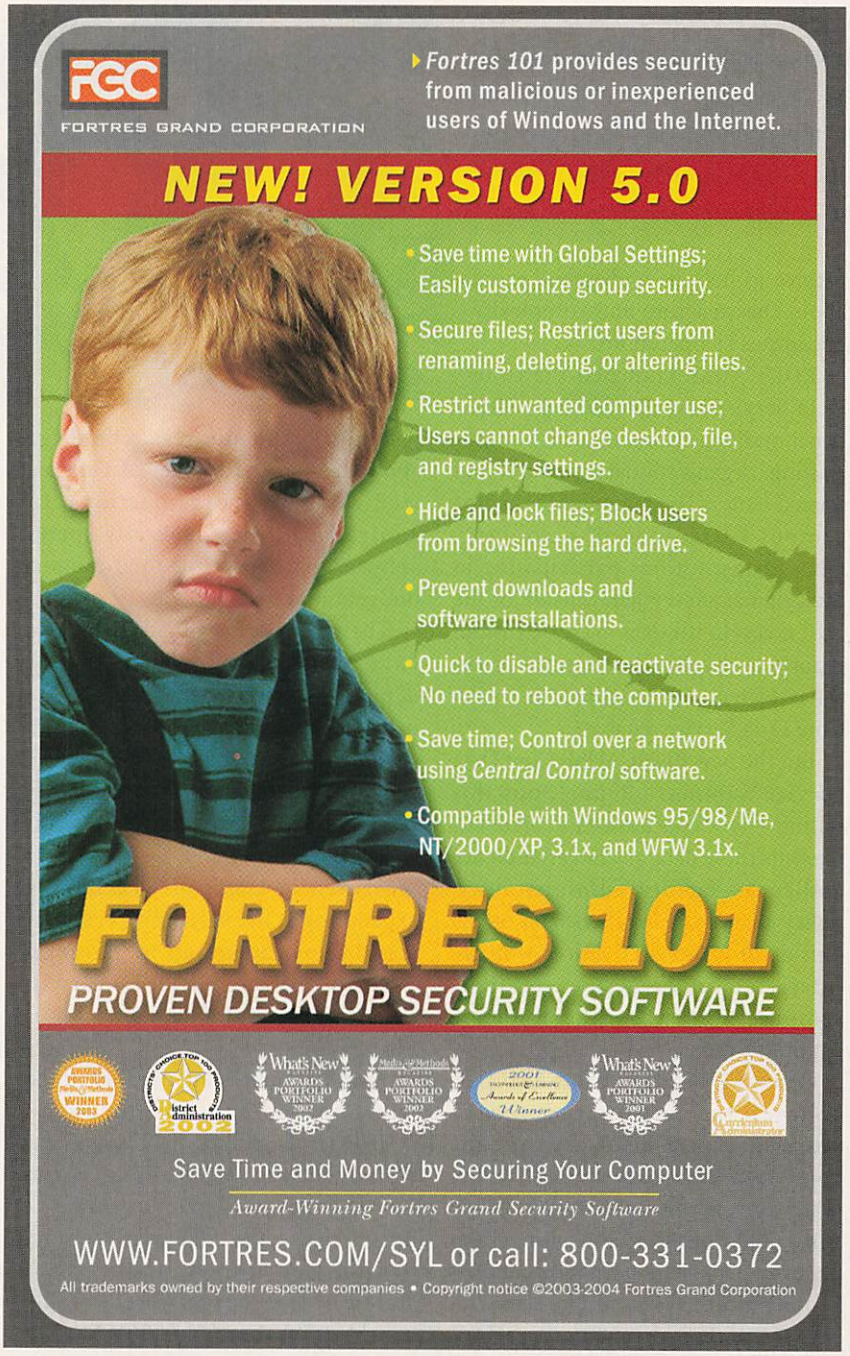
Finally, the report documents the age of—and rapidly aging—administrative software that remains a core component of the campus infrastructure. Across all sectors, large numbers of institutions remain dependent on student information systems and financial software developed or purchased more than a decade ago. This aging software was not designed for a Web-centric world and would seem ready for immediate replacement. However, the budget cuts and financial problems currently affecting most institutions will force many campuses to defer or delay replacement for a few more years.

The new EDUCAUSE Core Data Summary Report warrants a wide reading, and not just among individuals in the campus IT community. It provides both interesting and useful information. And future editions of the report will be even more valuable because of the emerging trend data.

As much of the campus discussion about money and technology is often based on *sum ergo* expertise, the EDUCAUSE Core Data Summary Report is an important contribution to better, more informed planning campus efforts. It should also help inform the continuing, informal hallway conversations and more formal policy discussions about a broad set of key IT issues that affect American colleges and universities.

[Editor's note: Casey Green will co-anchor a special Ahead of the Curve broadcast session, "An Open Discussion About Open Source" from the Syllabus fall2003 conference in Cambridge, Mass. on December 8. For updates, visit www.syllabus.com.]

Casey Green, Ph.D. *(cgreen@campuscomputing.net), founding director of The Campus Computing Project (www.campuscomputing.net), is a visiting scholar at The Claremont Graduate University and a visiting professor at Case Western Reserve University.*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Sally M. Johnstone

DISTANCE LEARNING

It's Time to Stand Up for Online Instructors

At most colleges and universities distance learning programs began as small experimental activities involving a few faculty members and, frequently, a special campus organization to administer the courses. As these programs became popular with students, administrators had to figure out a way to accommodate the growing enrollments. All too often this was done by hiring qualified individuals who could teach an extra section of the course when enrollments reached whatever was determined to be the maximum class size. These might be called adjunct or part-time faculty members, graduate teaching assistants, tutors, or any number of different titles. However, their numbers have soared and the ways they are compensated and supported by most of campuses do not fit current realities.

Here is a fairly typical scenario. The part-time instructor agrees to teach a section of a course that has been developed by someone else. In most cases the development involved a single person using a standard course management software package with little, if any, instructional design support from the campus. Rarely does anyone else review these course materials before they are used in a course. The course materials may, or may not, be well designed and integrated. Regardless of the quality of the course materials, the part-time instructor inherits them. In entry-level courses, which are frequently the most popular and likely to need extra sections, the students are quite heterogeneous. Some are taking their first college class. Others already have graduate degrees. Many are taking their first on-line course. Our instructor is likely to spend anywhere from 10 to 18 hours a week monitoring discussions, answering student e-mails, grading tests, and correcting problems with the course materials.

Our instructor is expected to have his or her own computer and Internet service provider (ISP). If he or she uses a high-speed connection service, this can cost anywhere from $40 to $60 a month. I do know of a few cases where campuses actually offer a subsidy to the instructor to help with those costs, but this seems to be an exceptional practice, not the usual one.

Based on a survey of online instructors' pay done two years ago, the average rate was $480 per credit hour. Thus teaching a three credit hour course would generate a salary of $1,440 for a 15-week term. If we consider the ISP fees alone (ignoring the cost of the computer), that means we are compensating these instructors at a rate of $8.60 per hour (in a best case scenario) or $4.70 an hour (in a busy week).

Unless these people are getting some other rewards from their campuses (exceptionally good staff support, recognition for service, etc.), it is easy to see why the best ones will shop for better deals, leaving many campuses to scramble to find well-qualified instructors for their distance learning students.

It may well be time to rethink this model. After all, it is based on the simple exportation of the classroom. The standard setup is a fixed number of students working with an instructor on textbook-based materials, coupled with online discussions, multiple choice online quizzes, and some essay questions on the final exam. Now we need to reallocate the resource pool to ensure the quality of the course materials and student activities, offer greater support to the online instructors to enable them to accommodate greater numbers of students, and recognize these individuals as real members of our campus communities.

Sally Johnstone *(sjohnstone@wiche.edu) is founding director of the Western Cooperative for Educational Telecommunications (WCET) and serves on advisory groups for state, national, and international organizations to help plan and evaluate eLearning projects.*

Designing New Learning Environments

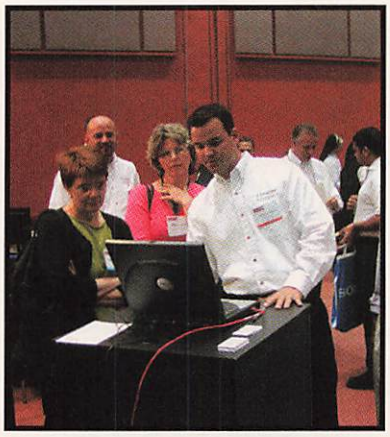
Students Share Control in Classrooms of the Future

By Paul McCloskey

"The future is already here—it's just not evenly distributed." This appraisal, quoting science fiction writer William Gibson, was offered by education consultant Judith Boettcher upon introducing the closing Syllabus2003 panel discussion this past July on the state of academic computing. It begged a question: If true, who holds the controlling share? By the end of the conference it was clear the answer was not planners but end users—the students and faculty power-users.

The creeping influence of end users over the choice of teaching tools and techniques was just one of the developments conference-goers grappled with at Syllabus2003. In other discussions, they peered into the classrooms of the future during a day at Stanford University. Campus chief information officers and technology leaders tore into research on the IT resource crisis at a Syllabus Executive Summit. And many heard Duke University law professor James Boyle advocate the virtues of disorder as a principle to cherish in the upcoming intellectual property wars.

But underneath the hub-bub, academic technologists expressed the growing awareness that a architectonic shift is underway in the academic IT community: that technology has now become embedded in the learning process; that end users are beginning to hold sway over campus IT directions; and that the learning and communications tools they are embracing are essentially consumer electronics.



"For me the Holy Grail is the transformation from an institutional model to a learner or individual model," said Frank Tansey, of CaliforniaColleges.edu. Right now the implementations are still institution-centric.

But once people start seeing their information out there, they're going to start saying, 'No, that's my information, not your information, and I want to use it the way I want to use it.' It will be interesting to see."

Lois Brooks, director of academic computing at Stanford, when asked if she had experienced an epiphany at the conference, said she was struck by the changing role of campus IT organizations, "...particularly the influx of consumer electronics onto campuses, of technology becoming much more accessible for the faculty and students. They're doing new and interesting things and quite often are far out ahead of our staff with what they want to do and try."

So far, in fact, that IT has become a given, like power or heating. "We don't have to think of technology as something special," said Kathy Cristoph, assistant vice chancellor for academic affairs at the University of Wisconsin at Madison. "Though it's troublesome for faculty, the students are experiencing it as a natural part of their learning. So I feel, let's get over this evangelism thing and just start dealing with that reality and using it to the best we can in learning."

The theme seemed to reflect the feelings of rank-and-file faculty. Jerry Meisner, a physics professor at the University of North Carolina at Greensboro, said, "We're content people, we're not education technology people. We're

High Performance Learning at Stanford

Syllabus2003 conference goers had an opportunity to take a glimpse ahead at a teaching and learning environment of the future with a full-day immersion at the Stanford Center for Innovations in Learning (SCIL).

The new center is housed in the campus's refurbished Wallenberg Hall, "a place for inventing the future of learning and the media across all spheres of scholarship and teaching," said co-director Roy Pea, professor of education and learning sciences at Stanford and co-author of the NRC report *How People Learn.*

"We're really working to make Wallenberg a new kind of commons for digital learning and media and teaching and scholarship," said Pea in the conference's opening keynote. "We want to provide a kind of a front door to Stanford for companies and external researchers to provide an interconnected hub to the various research centers and programs on the campus that focus on interactive technology and learning."

Building the center was inspired by the idea that new tools and techniques for representing ideas—maps, matrices, programming languages—do more than just amplify existing teaching practices. Instead, they "make possible new kinds of thinking, reasoning, and social practices," said Pea. In the end, they "change the very infrastructure for doing learning."

The new facility would be place where teachers and students from across the disciplinary spectrum could use new tools to build "high performance learning environments," said Pea, where the "people that are experiencing that environment—the learners and teachers—feel they're operating at a higher level of performance than they do elsewhere."

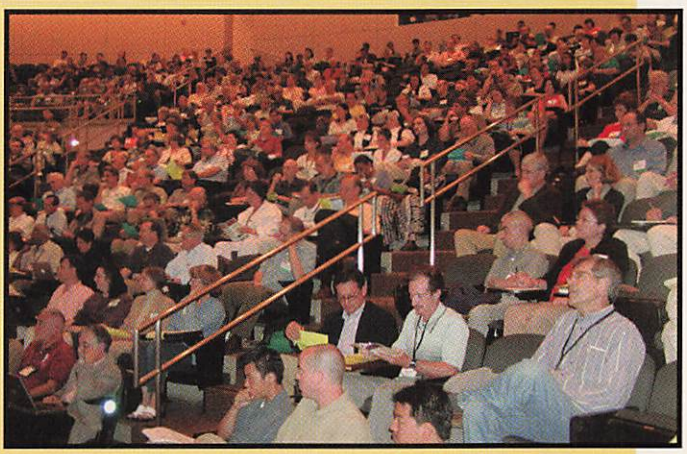
To deliver on that, the center is fielding a welter of technologies, from the video technologies, smart panels, Webster interactive boards, and wireless networking links. Tying these tools together are several software platforms, including:

iRooms: Provides support so that anyone in the classroom, using their wireless devices, can co-develop computer-based documents, models or other artifacts in real time without an esoteric operating system. "The key part from an instructional perspective," said Pea, is that the collaborative support can make students' and faculty members' thinking visible, which is really a central feature of many of the pedagogies that come out of the learning sciences."

PointRight: Helps users share control of the large Webster displays and collaboration stations or smart screens so that multiple students can work, on a single document, presentation or model.

Multibrowse: Enables file sharing between classrooms so that a user can select a computer or smart board that he or she wants to send a file to. In response, a Web page launches on the destination computer or the file shows up on the desktop of the computer that receives it.

Stanford professors are experimenting at Wallenberg with tools in various combinations to teach courses on Japanese conversation, the history of computer gaming, poetry of Horace, as well as child development and archaeological computing. For a program on writing and rhetoric, Professor Andrea Lunsford has students work in small groups, facilitated by 2'x3' flat screens on wheels. Using iRoom software, they can drag files from their laptops onto the collaboration station desktop to create, edit, and critique their work together. They then bring the results of their group work to the whole class on the large Webster screen. Lunsford says having students put their writing on a larger screen allows them to physically as well as psychologically distance themselves from their work. That seems to help students open up more easily to peer review.



In a recent effort, Sun Microsystems has also been helping the center develop Conductor, a room configuration system that hides and automates many of the facets of the Wallenberg classroom infrastructure so that they can be used more easily by non-technical teachers.

Pea himself is using the center to work on a project called Diver for doing video analysis of learning and teaching processes. Using multiple cameras and video technologies, Pea's team is performing video data capture of teaching sessions that allows researchers to go back and establish "path movies" through the video in order to do later pedagogical analysis on them. Eventually faculty will use the system to help mentor teachers.

Ultimately, Pea told the conference, Wallenberg's mission can be compared to the Jeffersonian concept of missions to the West. "We need learning expeditions in which we can begin to define and invent and study life in these new representational ecologies, and we're hoping that Wallenberg can serve as a kind of a laboratory for that and would welcome you working with us and us with you to help advance these considerations."

Portals
Technology lesson: Portals are tough to implement and tough to maintain.
The biggest challenge to having a "single-sign on" portal is the difficulty of integrating multiple old/new ERP systems.
"The issue I see on the horizon is how to get my people up to speed and keep them current with portal technologies."

delighted that there seems to be a growing emphasis among education technology people that we need to be much more concerned about learning and less concerned about the delivery systems and the newest technologies which are available. We'd like to have more confluence between the content people and the technology people so that the students are at the center of what's going on."

If that becomes the model, then the research going on at Stanford's Wallenberg Hall and the Center for Innovations in Learning may best describe how students and faculty will interact with technology tools in the future. The Wallenberg classrooms feature an abundance of state of the art yet commercial technology tools which are easily reconfigured to suit the immediate needs—even whims—of students and faculty (see sidebar).

Said Kathy Christoph: "I think things like wireless are really challenging what people do in the classroom, both students and faculty. In looking at the Wallenberg classrooms, there is no 'sage on the stage' ... I can imagine that the students would be controlling those classrooms. They'd come in, move the chairs, move the screens, decide where they wanted to gather, and just get going. That's a very different kind of teaching and learning."

Some faculty members seemed to view the idea of students taking more control of their learning ominously. One rose and said, "I think the biggest problem is with the faculty, at least back on my campus, they don't know how to think creatively about teaching in this new mode. If you get the students in control and you really need to deal with this content because that's your job... How do we get creative about moving this content through all of their media?"

In an era of end user hegemony and easy file sharing, new ideas about authorship will be necessary, the panelists said. "There is a whimsical definition in higher education of collaborative learning—its called plagiarism," mused Tansey.

Phil Long, senior research strategist at MIT, called for a deeper understanding of the rules of engagement for collaboration. "One of the things that we need to focus on is understanding what a derivative work is and how you go about creating a derivative work collaboratively, preserving the importance of attribution but at the same time painfully and obviously borrowing on each other's ideas so that there is something new that's added to it."

Coming full circle, Boettcher emphasized the idea that parts of the community are closer to the future than others. "So you've got a pocket on campus that's in the year 2020 and you've got another pocket that's back in 1965," she said. "I think one of the patterns is that we just have a lot going on. There's a lot of input to the classroom. It's not just self-contained... Faculty used to be able to semi-control or command the content, and now the students are just out there bringing all sorts of content in."

Syllabus Executive Summit

On Sunday evening at the start of the conference, a select group of chief information officers and campus IT leaders were invited to attend the Syllabus Executive Summit, where a survey of their peers' opinions on the state of the higher education IT issues was presented.

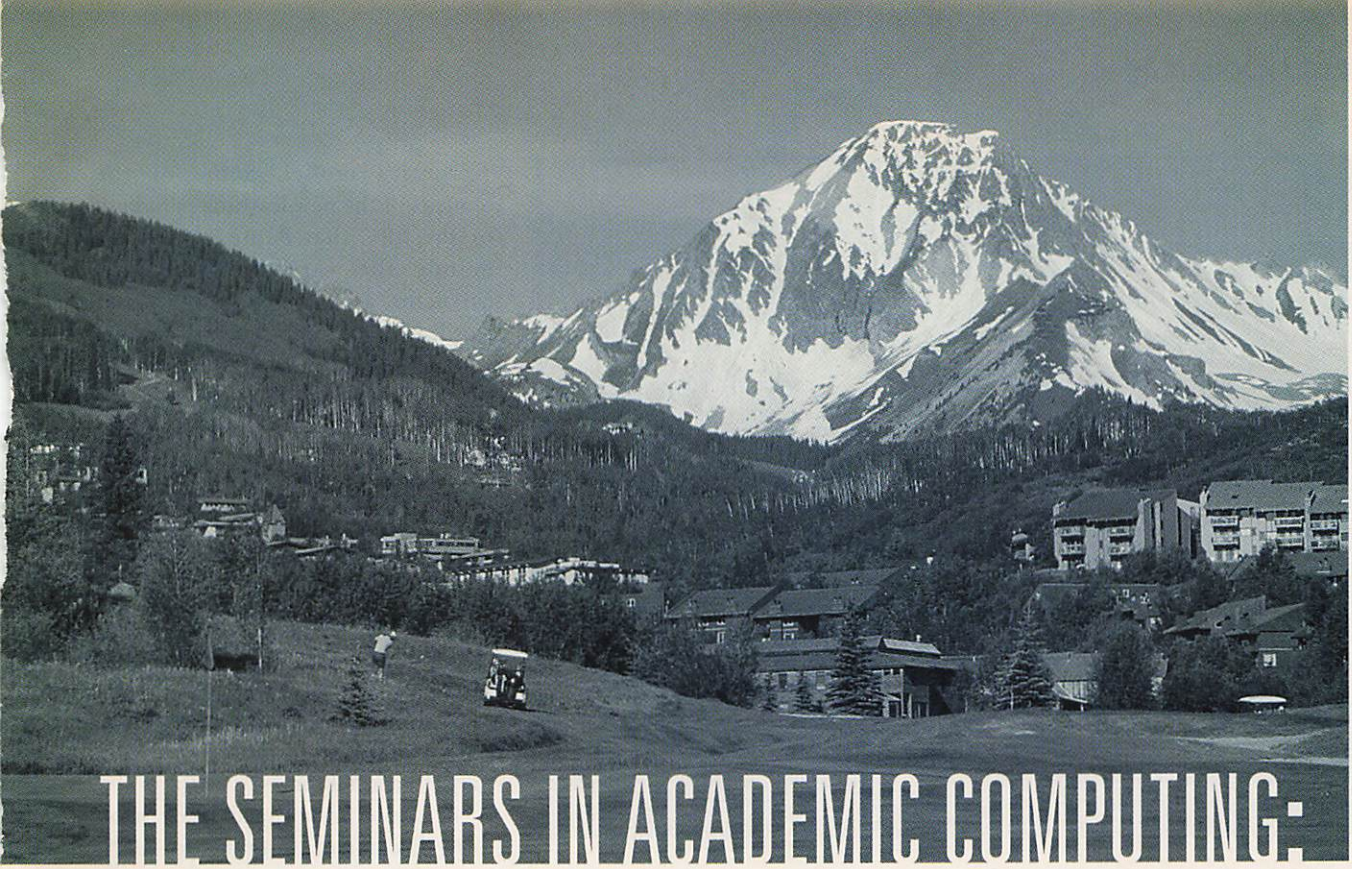
The top priority of higher education leadership from the survey was course management systems—many of which had recently undergone stiff price increases.

Many respondents said that CMS vendors need to more carefully consider how their systems will integrate with other ERP systems, and pay more attention to support. They believe that CMS vendors "have invested more in additional product features than in providing the level of resources needed to support the products they have already sold," according to the survey report.

Going, Going, Gone

Panelists in the Syllabus2003 wrap-up session were asked to name technologies, systems, and traditions they believed have reached the end of their useful life, that are "over and done with." Here are some of their responses:

- Presentations about 'how I merged my IT and academic organizations together.'
- Spending $50,000 or $100,000 on building a CD for one class that was 'really cool' and had a lot of sound and motion.
- Computer classrooms with row upon row of tables where the faculty member sees only the backs of monitors and maybe a little hair sprouting out from the side. Now we have this radical technology innovation called a caster that allows for flexible reconfiguration of chairs and tables. It's a big deal.
- Textbooks
- Distance Education by Teleconference
- Monolithic learning objects



THE SEMINARS IN ACADEMIC COMPUTING:

TEACHABLE MOMENTS AT HIGH ALTITUDES

By Judith V. Boettcher, Designing for Learning

"The texture of experience, immediate feedback, and individual support" are the qualities that make a truly satisfying and useful learning experience, said Larry Faulkner, the president of the University of Texas, in his opening keynote address at the 33rd conference of the Seminars in Academic Computing (SAC). These are the same characteristics that make this Colorado meeting a favored gathering for higher education campus IT leaders.

At this summer's SAC conference, three keynote presentations focused on ways of supporting learning experiences. The EDUCAUSE affiliate conference highlighted the theme of "Teachable Moments—Learning to Support Learning."

Faulkner's keynote address focused on the framework of a new budget model based on funding trends for public research universities between 2003 and 2020, culminating with a challenge about learning. That challenge was to "reshape the current model of teaching and learning using technology." In Faulkner's model, this reshaping is a key requirement for enabling public research universities to remain competitive with the large private institutions in providing a quality higher education experience. His thesis is that the large public institutions will not only survive, but thrive. However, the thriving may well be based on their research mission, rather than their teaching and learning mission.

Faulkner noted in his budget model that for many large public institutions, 70 percent of the costs for teaching and

What's the Buzz?

An update on the language of IT

It is a rare IT conference that does not assume that attendees are familiar with all the new acronyms that dynamic initiatives have generated. Below are some keepers from the 2003 SAC conference.

OSID OKI Service Interface Definitions: OSIDs are similar to APIs, and are now an integral part of the OKI initiative vocabulary. OSIDS (pronounced "Oh-SIDS") are the specifications that help to ensure interoperability among the open source projects being developed at various universities.

JIT/JFM: Most educators and trainers are familiar with JIT, for Just in Time learning. The next level towards achieving customization of learning is JFM, or Just for Me learning. This acronym is industry wide and also being used in the BBC retraining effort, helping the staffers to focus on not only what is needed for their jobs, but also on what is needed by each person individually.

eLearning: Most of us are now quite comfortable with this term. But hold on to your seat belts, because now it is being suggested that the "e" is not necessary, and thus we will be probably just talking about "learning" again.

learning is in salary costs, and another 30 percent is for operations. He envisions a new reshaping that creates a paradigm with less dependency on faculty, and more reliance on information technologies that will retain the quality of education for which major public institutions are known. With this stance, Faulkner balanced his doomsday concerns about the large public institutions with his vision for shaping an alternative future.

The message from Nigel Paine, head of training for the BBC, echoed that of Larry Faulkner. Paine's message, while emanating from a very different perspective—that of one of the largest media organizations in the world—was also framed in terms of the learning challenge facing the BBC. That challenge is to reshape the existing expertise and learning model for its large staff of more than 27,000, including over 350 Web masters, to accommodate the needed retraining and expectations for lifelong learning. This challenge is being driven by the goal of transitioning BBC operations to a fully digitally designed, created, produced, and managed environment in five years.

Paine framed his message with the lines from a Bruce Springsteen song, "Thunder Road." He introduced his message with the sentiment, that "We got one last chance to make it real," referring to the need to make the new technologies truly relevant and useful in meeting our teaching and learning challenges. And he closed with "...and I'm pulling out of here to win," showing his enthusiasm to help make it all happen.

One illustration of making it "happen" at the BBC is the project of interviewing the "older generation of journalists, photographers, and editors" to capture their expertise—and providing that content on demand as part of an updating of the older apprentice model. Some of the elements of the new learning paradigm for the BBC that Paine is creating include the varied roles of an instructor, a learning community, a knowledge base, the strategy of "asking an expert," and classroom workshops.

As an illustration of the younger generation pushing the existing generation of media leaders, Paine showed a four-minute digital short, produced and edited by two 17-year-olds with a yen for playing around with digital files. It is an acclaimed digital short about a jumbo jet crash-landing on a busy L.A. freeway. Don't miss it, as it is available at http://www.405themovie.com/. Rest assured that it is actually a humorous take, not a serious story of a crash and really just a lot of fun.

The closing keynote address by Susan Perry, director of programs for CLIR (Council on Library and Information Resources) provided a look at real students talking about what they would like in their teaching and learning experiences. Her talk, "You Know, We Write an Awful Lot of Papers" provided a glimpse at students, all from liberal arts colleges participating in the National Institute for Technology and Liberal Education (www.nitle.org), who want to produce multimedia "papers," build Web sites, and produce and "read" films as part of their education. Faculty, on the other hand, even if willing to adjust to students producing and learning via these multimedia experiences, feel challenged and unprepared to evaluate student learning as evidenced in the production of electronic and multimedia formats.

In addition to the focus on learning in the keynotes, the other sessions, discussions, and tutorials at SAC considered budget and funding models, networking technologies, studies and stories, and infrastructure issues. Some of the key infrastructure issues are those that emerged 2-3 years ago, and for whom progress is now evident, including security, portal development, open source course management systems, and single sign on solutions with Pubcookie and Shibboleth.

Just for Fun

Here are a couple additional new acronyms that are amusing for the moment:

WHAMP: What is Happening at My Place, as in having a sharing discussion about what is going on at your campus.

CTNG: This stands for CHEF, the Next Generation. For those in the know about OKI open source initiatives, CHEF is the course management initiative at the University of Michigan, and CTNG is their name for the next version, which is in development. This acronym will probably change!

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- Webster University increases access and convienience to support teaching and learning.
- IS management at Johns Hopkins Bloomberg School of Public Health addresses security risks.
- The University of Cincinnati migrates microfilm to an electronic content management system.

Webster University ▪ By Larry Haffner and Will Godfrey

Transforming Portals from Gateways to Enablers of Institutional Goals

For some institutions, the term "portal" brings to mind *a gateway to an institution's online resources and services.* Sophisticated portals and integration technology enable much more than just a unified gateway. Portals have the potential to become the ultimate point of organizational integration, where the university community can access electronic services and resources in support of quality teaching and learning.

Like most institutions, Webster University has been doing a pretty good job of delivering basic Web services. We now offer students complete degree programs online. Yet, the students can't conduct all of their university business electronically. Currently, Webster University's Web services have more to do than meet isolated functional needs—they must be woven together to serve the university's overall goal of providing increased access and convenience in support of teaching and learning.

We determined that we must implement new portal technology that would achieve the following three objectives:

- Distribute the capability for Web content management throughout the institution while maintaining consistent presentation and navigation.
- Provide centralized and customized access from a single sign on.
- Integrate all underlying data and applications.

We are currently in the process of implementing SCT's Luminis software to achieve these objectives. We expect the implementation to be complete at the end of 2004.

Maintaining Consistent Presentation and Navigation of Web Content

Like other institutions, we place an emphasis on allowing easy and flexible access to our resources and curricula. We have 100 educational centers throughout the U.S. and seven international sites including Switzerland, China, and Thailand.

Each of our extended sites has a unique identity and message to convey to the students. Individual departments want Web pages and a Web presence, but not every location has access to a knowledgeable graphic designer or a good writer. It is impossible for our IT staff to reach and train individuals at all our sites on how to develop good content for the Web and link it well. Our challenge is to provide authors in this distributed environment with the tools they need to get their content out on the Web while maintaining a consistent and user-friendly Web presence.

To address this issue, we licensed content management software that will give non-tech users throughout the world the tools needed to easily publish their unique content within an attractive and navigable framework. In addition, these tools will allow our various sites to keep their Web content up-to-date, which is essential to the success of our Web efforts. We've learned the hard way that creating Web pages is only the beginning. Those pages must be kept current, otherwise, the effort is wasted.

When implemented, this content management model will allow our staff worldwide to manage content within a framework that provides ease of use, accessibility, and a consis-

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tent presentation of the university's image online.

Providing Centralized and Customized Access from a Single Sign On

Once the information is up on the Web, it needs to be readily accessible to users. Webster University's current online information is not accessible from a single point of access, and the onus is on the student to figure out which department handles what function. The process is frustrating and time-consuming. In the past, students have accepted the difficulties and complexities of conducting business with the university. But, now, we're dealing with undergraduates who have interacted with the Internet since they were 12 years old, and sophisticated adults who have a much higher expectation for online services.

To tackle this challenge, we implemented technology that will provide centralized and customized Web access to campus information, services, and communities from a single sign on within the portal. Users will be able to read only the announcements targeted specifically to them, check their e-mail, collaborate, and of course, attend classes—all from within one portal, with one sign on. At the same time, the portal will provide intuitive navigation to orient users as to where they are within the framework of Web services, whether they are paying bills or taking a course online.

The portal we will offer students will have advanced messaging tools like forums, a chat interface, and message boards. Having those community elements available within the portal—rather than only within a course management system—will allow extensive access for instructors to create a cyberspace where students can chat and collaborate, as well as provide a discussion forum for student groups, faculty projects, and other communities.

Integrating Underlying Data and Applications

A final challenge is integrating the back-end databases and applications throughout our university. This challenge grows almost every day as different departments and colleges request that access to their information or services be made available online. For example, development offices want to communicate with alumni via the Internet; Career Services, the Registrar, and many other stakeholders have unique online communications needs. Of course, online education presents a challenge all its own.

Many resourceful students and faculty at our university have found ways to get their services or information online. The result is a myriad of subsystems that are not integrated. We currently collect data through various Web-based sources, then reconcile the information into our administrative system—by hand. This process is time consuming and inefficient.

We need to make all of our current and emerging online services available to users through a single point-of-access, *and* we need to integrate all the corresponding data that flows from multiple sources. This type of technology provides for integration of services and applications that *underlie* the portal. In the future, we will have data integration and sharing among our diversified campus systems, applications, and databases. For Webster University, this means that information and services from our Jenzabar CX administrative system, our WebCT course management system, e-mail system, calendar, other applications and databases will be integrated and available from within a single portal. The benefits of the movement of data between these systems will be significant, including automatic creation of e-mail accounts, online courses, calendars and forums. The resulting digital campus will be open, interoperable, and extensible, allowing us to continue to bring new applications online, as they become available.

Admittedly, the integration will present some challenges internally. It will force a cultural change, bringing together departments and people that

seldom interacted in the past and who will have concerns about losing control of their data and business processes. In order to gain consensus on a solution, we will need to collaborate with, and get buy-in from, people in various departments, on the other side of the country, and even on the other side of ocean. But the integration, as well as the other tools and enhancements we are bringing to our portal, is essential.

Ultimately, the integration consolidation, and availability of self-service applications from a single sign-on, will prove beneficial to our user-base, resulting in an increased use of important back-end systems, increased communication between constituents, and decreased administrative burden. As a result, our portal will be more than a point of entry to the university; it will be an essential enabler of the institution's goals.

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Johns Hopkins Bloomberg School of Public Health

Improving Collaboration and Information Protection with Web Standards

A leading international authority on public health, Johns Hopkins Bloomberg School of Public Health (JHSPH) carries out its mission in research facilities and educational centers located in 40 countries. More than 1,500 students and 1,000 faculty work together every day in this global effort, managing 25 research initiatives including bio-terrorism detection, disease prevention, and healthcare management. Each initiative generates tremendous amounts of information including research data, analysis, and course materials created by its researchers, students, and faculty. In total, this output represents one of the school's greatest assets.

Many of the files generated are too large to e-mail as attachments, so the standard practice was to load files onto a floppy disk and mail them. IS management at Johns Hopkins Bloomberg School of Public Health needed a way to address this security risk. "With a large amount of field work done in developing countries and remote locations, e-mailing attachments was simply not an option. A single large attachment could unacceptably delay communications for hours or even days," explains Michelle Campbell, assistant director for IS at Johns Hopkins Bloomberg School of Public Health. From a user standpoint, there was a growing need to access and share information quickly among participants in a way that was simple to perform and possible from remote locations.

The file system for Johns Hopkins Bloomberg School of Public Health is centrally located and each area of research accesses the same file system. The IS team wanted to promote accessing the file system from any PC in the world by encouraging traveling researchers to access their files from any Internet-connected PC, such as in a cyber café. This would reduce the risk of losing files carried on disk or on the hard drive of a laptop.

The JHSPH Portal

The IS team's first decision was to build a Johns Hopkins Bloomberg School of Public Health portal to provide a single Web-based point of entry for all users. Using Citrix technology for the branded portal, my.jhsph.edu, users were encouraged to visit the portal for the latest news and information about the school. "This was a great way for everyone in the field to get familiar with using the Internet to access information," explains Campbell, "but the portal was only the first step." The portal solution had a document storage component that allowed users to store files privately, but it was difficult to use. Many users would go to the portal to access published information, but would not use it to manage or share their own information. They needed a simple way to post their files to the Web portal without having to learn how to become Web publishers.

Once the Johns Hopkins Bloomberg School of Public Health portal was introduced, the team moved on to the next step, finding a safe and easy way for users to post their own information to the portal and begin to share it with their colleagues. "We had discussed FTP (File Transfer Protocol)," Campbell says, "but it requires a client, which meant additional costs—including client licenses for every user and the time to teach everyone to use it. We wanted to try and find a technology that didn't require a client so users could

get to their files from any PC." Users at Johns Hopkins Bloomberg School of Public Health had already become familiar with using the Web-based interface of the portal. Campbell hoped to find a solution that could function within the portal that also wouldn't require extensive training for its users.

The team identified a technology that was designed around the new Internet standard WebDAV (Web Distributed Authoring and Versioning). Xythos WebFile Server (WFS) provides users with safe file access from any Internet location via a Web browser. Support for SSL (secure socket layer) encryption for all file requests ensures that users can safely access their files from remote locations (such as a research site). At the same time, IS can protect these files by backing them up and maintaining them within a more securely managed environment. The WFS makes working together easier for users with collaborative features including file versioning, check in/out, logging, and automatic subscriptions.

Xythos WFS: Deployment and Integration

The WebFile Server's J2EE architecture, built-in XML support and fully documented APIs make integration with other campus systems, such as the Johns Hopkins Bloomberg School of Public Health portal, a relatively simple process. The WFS supports all leading servers, including UNIX, Solaris, Linux and NT/2000 as well as popular client systems such as Windows, Macintosh, and Linux. The WFS can also utilize campus NAS and SAN standards for flexible file storage solutions. Johns Hopkins Bloomberg School of Public Health chose Dell 2650 PowerEdge Dual processor servers, Microsoft SQL and an external SAN. The network is 100MB switch. "The WFS took about two weeks to install," says Campbell. It also integrates directly with Johns Hopkins Bloomberg School of Public Health directory services, Active Directory, minimizing security maintenance.

Xythos WFS was introduced to users at the same time the portal was updated and re-launched. Johns Hopkins Bloomberg School of Public Health users were already familiar with the portal and, from there, were able to log into their WFS to access their files. Following the successful implementation at the Bloomberg School of Public Health, the School of Medicine at Johns Hopkins is currently reviewing WFS to offer its students "lockers"—personal Web spaces for accessing and storing their files.

Michelle Campbell *(mcampbell@jhsph.edu) is assistant director for IS at Johns Hopkins Bloomberg School of Public Health.*

University of Cincinnati

Archival and Retrieval Solution Speeds Records Management

Archiving is a daunting task for record clerks across the board, especially those working with an antiquated microfilm system. At the University of Cincinnati, a study conducted with the assistance of an outside consultant pointed to the need for electronic-based methods that would digitize paper and microfilm images, archive the converted images in their original formats, and make them available on demand via internal networks and the Internet.

The University of Cincinnati has more than 300 departments and a total of 12,000 active employees. The Human Resources Department is the official custodian of records for all historically significant documentation related to current and past university employees. State law requires the university to provide access to personnel files. Documents that provide detailed information related to employment events must be retained for as long as 75 years after employment ends.

The Need for a New System

With more than 2.5 million documented employee records stored in more than 700 microfilm cartridges—each with approximately 3,700 image frames—the volume increased, delaying responses to inquiries. And the daily workload continued to increase as staff reductions, budget restraints, and external compliance issues were imposed.

With the old microfilm-based system, the Human Resources Records Office batched its daily input until 3,700 pages were accumulated. Then, the batch was sorted alphabetically and filmed, the microfilm was sent off-site for developing, and the paper was retained for later film quality control checking and indexing. A week or two after that, a working copy and the master of each cartridge would be returned to Human Resources.

The Records Office receives requests for historically significant employment information from throughout the university community as well as from government agencies, banks, attorneys, and other authorized sources. These telephone and mail requests were averaging more than 250 per month. Processing these requests using the microfilm-based system required considerable time, often taking several weeks for research and preparation. The university decided to create a new a system built around IMR's Alchemy Gold, a Windows-based document management system.

Merging Data

A Wicks and Wilson 4100 scan station was used to digitize the microfilmed images. Once captured, the images and corresponding index data were QCed and then merged together into several

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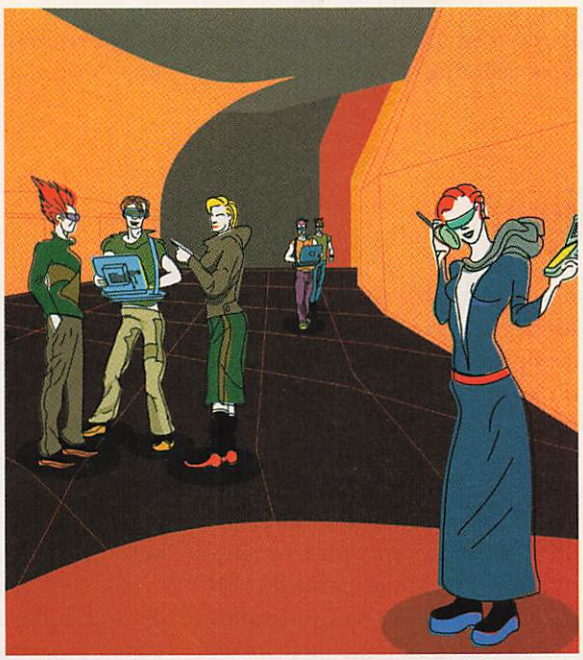
FEATURED PRODUCT

Groove Workspace: Instant Messaging Grows Up

Instant messaging isn't just for kids anymore. Once the exclusive domain of idle chatterers, IM programs have gained professional credibility as vendors have added security and business features. In fact many IM systems have become multi-purpose collaboration tools complete with chat rooms, conferencing, screen sharing, whiteboards, video, and broadcasts. When applied to the realm of higher education, these tools are being used to supplement the classroom experience to create an enhanced distance learning environment.



Collaboration across organizational boundaries, once an option, is now becoming a requirement for people serious about sharing information. E-mail, the traditional standard in collaborative applications, limits multi-dimensional interaction between members of a project team. Desktop collaboration is software that naturally leverages a person's familiar desktop environment to speed work with colleagues on projects that ordinarily occur in e-mail.

Groove Workspace, from Groove Networks Inc., is a product that has made the switch from communication to collaboration tool. Workspace is a desktop application for small groups that leverages e-mail and Microsoft Office for interaction across technical and organizational boundaries. With Workspace, users create virtual shared spaces where they connect immediately and directly to work on a projects, brainstorm, plan an event, hold discussions, share drafts and proposals, and, coordinate schedules. The shared spaces require no server setup and end users are in full control.

Groove Workspace sits directly on users' PCs, not a Web site or centralized server. All application logic and data is stored locally on the desktop of each member of a shared space. If there are four members, there are four local copies of the space. All content, activity, and gestures made by any member of the space are immediately duplicated on the desktops of the other members. Peer-to-peer communication is handled via XML message passing, which makes for lightweight traffic and efficient use of the network.

There is no 'master copy' of the data in a shared space. Each member's copy of the data is a peer in the network, and the Groove platform ensures that the content and state of the shared space is always synchronized across all members' machines.

The Groove platform is based on a hybrid architecture that includes a role for a server or switch, called the Relay Server, to broker connections between offline members (who may never be online at the same time) and members separated by network firewalls. While working offline, all work performed within the Groove workspace is stored. When the user is online again, the client-side pings the relay server to store and deliver the changes.

Requirements for set-up of Groove Workspace include a Microsoft Windows operating system (98, NT, 200, ME, or XP), an Intel Pentium II processor of 400MHz or higher, 128MB RAM, and

100MB of free disk space with additional space required for data. A minimum resolution of 800 x 600, 15-bit (32,768) color is required for the display, and speakers, a sound card, and a microphone are required to use the voice features. Software requirements include Microsoft Internet Explorer version 5.0 or later.

Courses in business, advertising, and Web design are just a few that typically involve group work and continuous communication among students and instructors. Students working together on a group project can also form their own workspace specific to their project or assignment in order to collaborate on their work in real time or asynchronously.

At the University of North Carolina at Chapel Hill, Robert Kirkpatrick, distinguished associate professor of English and director of the London Summer Honors Program, has used Groove Workspace for the past three years to conduct two first-year seminars. One of the features he finds most useful is having persistent access to dated poem drafts and annotations, which simplifies the revision process and gives instructor and students more time to develop craft. He also makes use of the software's threaded discussion list and archiving capabilities. Kirkpatrick and the students use Groove's Discussion tool for a class forum, and the chat feature makes for "a practical as well as lively 'after hours' dialogue that seemed to go on at all hours," he said.

The Naval Postgraduate School in Monterey, Calif., has also had success using Groove Workspace for distance learning. Their challenge was to provide a virtual classroom experience as similar as possible to the physical classroom environment—a daunting task considering some of the students were in extremely remote locations using low bandwidth connections, which made voice messaging difficult. By moving a Web-based distance learning system such as Blackboard into the Groove browser, the users all have the advantage of seeing who is in attendance, having the lecturer navigate all their screens together, and most importantly, users are able to voice message each other.

According to Groove, Workspace is a tool that creates a cohesive classroom environment that allows classmates to socialize around academic content in a way that is meaningful, natural, and easy, with complete personal control. It also offers a medium for group projects, in which the dynamics of teamwork unfold in a way that accords to student lifestyles.

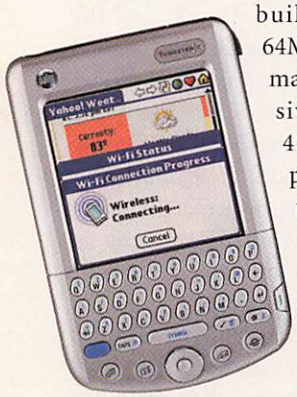
Information about ***Groove****, visit* http://www.groove.net/

PRODUCT ROUNDUP

PDAs Get Wireless Religion

Palm Tungsten C

The Tungsten C is Palm's first device to ship with integrated 802.11b technology (also known as WiFi) for wireless campus connectivity. Some features include: a built-in keyboard; 64MB of memory to manage data-intensive applications; 400Mhz of ARM processing power to drastically reduce wait times for almost any query or application; and integrated, full-featured business applications, such as VersaMail 2.5 and DataViz Documents To Go for managing Microsoft Word, Excel, and PowerPoint documents. The TFT display offers clear, high-resolution viewing inside classrooms or outside on campus.



This handheld provides the most memory available for any Palm OS based device. An internal rechargeable battery provides a full day of consistent WiFi connectivity, or five days of average handheld use.

If you require behind-the-firewall access to institution or university networks, the Tungsten C ships with a built-in PPTP (point-to-point tunneling protocol) virtual private network (VPN) from Mergic. This solution enables users to securely check e-mail, browse the Web or institution and university networks, and wirelessly synchronize with their desktop to back up information and receive the latest e-mail, documents, calendar, and contact information.

Information about ***Palm Inc.*** *products is available at http://www.palm.com*

Dell Axium X5

Dell's Axim X5 is equipped with Microsoft Pocket PC 2003 Premium and preinstalled with familiar applications like Pocket Word and Pocket Excel, along with a calendar, contacts, voice recorder, and a number of other built-in features.

Axim X5 special features include built-in Secure Digital (SD) and CompactFlash II (CF II) expansion slots, a removable, rechargeable battery, and a scroll dial located on the left side of the device, making "one-handed" operation easy.

The CF II card slot located on the top of the unit can accommodate additional memory expansion or wireless options like WiFi or Bluetooth cards. Use the (SD) card slot located on the upper left side of the unit for memory expansion, to store files and presentations for productivity on the go, or store MP3 music or eBooks for entertainment.

The Axim X5 features a removable lithium-ion battery and an optional high capacity battery for extended battery life. The Axim X5 offers an optional cradle with a battery charging slot, and will dock to the cradle with either battery installed. Keep a spare

battery charged in the cradle at all times and simply swap batteries as needed.

Information about ***Dell*** *products is available at http://www.dell.com/us/en/gen/default.htm*

Handspring Treo 600 (Pre-release)

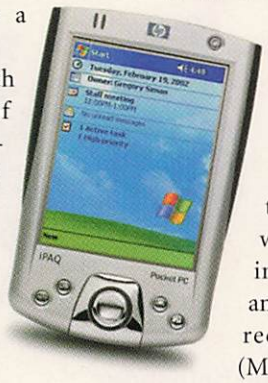
Handspring's Treo 600 series was named "Best of Show" in the mobile and wireless services category at the CeBit America trade fair in New York, N.Y. The upcoming Treo 600 smartphone series combines a smaller, more phone-like design with a full QWERTY keyboard that is small enough to fit on this compact device but still big enough to enter text quickly and accurately.

New design features include a fast Palm OS 5 organizer running on an ARM processor, and a new Web browser that allows surfing of any Web site—including JavaScript enabled sites—and even download software. The new Treo 600 also has a built-in digital camera to take and send pictures or connect a face to a phone number with picture caller ID, and a built-in SD/MMC expansion slot for adding memory, content or hardware (supports SD I/O).

Information about the ***Treo 600*** *is available at http://www.handspring.com/treo600/ index.jhtml*

HP iPAQ h2210/2215

The HP iPAQ h2210/2215 is the smallest Pocket PC on the market to include dual slot expansion (CF II and SD). The h2210's small, sleek design also includes integrated Bluetooth wireless capability, enabling wireless synchronization and data sharing through a personal area network to other Bluetooth devices. In addition, the h2210/2215 includes Nevo universal remote control software, allowing users to control all their home and office audio and video equipment with a single device.



The device comes with 64MB of RAM (56MB of main memory), the 400-MHz Intel X-Scale PXA255 applications processor, and the full Pocket PC 2003 Suite, including Microsoft Outlook, Pocket Excel, Pocket Word, etc. Multimedia capabilities are enhanced by an integrated graphics controller for faster, smoother video. A slipcase and desktop cradle with an extra battery slot for charging is included with the device.

Information about the ***HP iPAQ h2210/2215*** *is available at http://welcome. hp.com/country/us/eng/prodserv/handheld.html*

Sony Clié PEG-UX50

The PEG-UX50 Personal Entertainment Communicator features dual wireless and is powered by Palm OS. With both WiFi and Bluetooth built-in, the UX50 offers two methods of wireless communication for maximum flexibility. By pairing the UX50 with other Bluetooth enabled devices users can transfer data between Clié handhelds, HotSync with a PC, or connect to the Internet via cell phone. When users enter a new geographic location, they can easily detect available WiFi signals through the device's embedded "sniffer" technology. The built-in 310,000-pixel digital camera is great for taking quick snapshots and transmitting over one of the wireless connections. It also incorporates a voice recorder and digital audio—so users can record and play back video (MPEG4, 30 fps, 160x112).

The new wide-screen design features a high-resolution 480x320 display. The wider display allows Web pages to be more readable. The screen lifts to expose the illuminated keyboard, or swivels to hide the keyboard and use as a touch screen. Plus, more room is available for the built in keyboard, allowing for more space between each key.

The UX50 also features Dedicated Internal Media Memory (29MB) for storing multimedia content. The Automatic Data Back-up feature helps protect information by moving data in RAM memory to non-volatile memory when a low battery state is detected.

Information on the ***Clié*** *line, visit http://www.sonystyle.com/*

Kensington WiFi Finder

Computer peripheral maker Kensington has introduced an alternative for users looking for Wi-Fi (Wireless Fidelity) connections when they're on the road: The WiFi Finder is a small handheld wireless network detector that works completely independently of your computer.

With the WiFi Finder, users can figure out if there's a wireless network before hauling out their iBook, PowerBook, or handheld to see if a connection is possible. The pocket-sized device measures about 2.95 x 0.39 x 2.17 inches, and sports a button for activation. A three-light display indicates signal strength, much the same way as Airport's menu bar signal strength meter functions.

What's more, the device is designed to filter out wireless signals emanating from other devices, like cordless phones, Bluetooth networks, and microwave ovens. Kensington claims the WiFi Finder sports a signal range of up to 200 feet, and detects both 802.11b (AirPort) and 802.11g (AirPort Extreme) networks.

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Teachable Moments at High Altitudes *continued from page 32*

One of several key sessions was the update on OKI, the Open Knowledge Initiative. This session, led by Lois Brooks of Stanford, and Normal Holland from Indiana University, focused on the new face of OKI work. The sessions covered the implementation of two open source initiatives, that of CourseWork at Stanford (http://coursework.stanford.edu/) and Oncourse at Indiana University (http://oncourse.iu.edu). The open source code for Stanford's CourseWork became available on June 30, 2003.

A key wrap-up comment towards the end of the OKI session involved a question about the integration of course management systems with campus portals. It was hinted that one future scenario for course management systems would be for the CMS to be a "channel" on the campus portal. This is a development area worth watching.

Some of the continuing emerging issues at SAC included the questions and challenges surrounding the management of content, such as the tools available and the costs and policies associated with managing content. A second continuing issue centers on ePortfolios. A new portfolio initiative, the Open Source Portfolio Initiative (OSPI) is another open source initiative to watch. One of the goals of the OSPI is to develop a set of portfolios and specifications for the array of portfolio needs that have been identified, such as personal portfolios, resume portfolios, promotion and tenure portfolios, and learning outcome portfolios.

SAC generally meets in late summer, around the first week in August. Next summer's dates are August 8-11. For further information, and for streaming video files of the keynotes and other sessions, visit www.educause.edu.

Judith V. Boettcher, Ph.D. (judith@designingforlearning.info) is an instructional designer and consultant in distance and online learning programs.

Case Studies, *continued from page 36*

different databases using DataGrabber. A Kodak 3590 color scanner was installed to scan new paper documents as they arrive in the department. Scan2 provides a seamless interface to the paper capture process.

An API application was developed to increase the speed with which the new scanned images are indexed and to enhance user functionality by drawing on reference resources both within the Alchemy databases and other University of Cincinnati computer systems. An IBM server configured with 180GB of RAID 5 storage is used to contain and manage the current HR system networked to three dedicated workstations. It provides a platform to support two concurrent build licenses and unlimited search clients.

Return on Investment

The university has successfully implemented a state-of-the-art electronic system that streamlines Human Resources Records Office functions while providing an avenue for future growth and technology innovation throughout the university. The new system eliminates the constant backlog, and documents can now be scanned and indexed as they are received. Now, 3,700 pages can be scanned, indexed, and available to users in only 90 minutes—rather than the minimum of seven days required previously. There is no need to wait for microfilm to be developed; electronic images are available immediately. The nine-step process required to create a document folder was eliminated. Files can now be transmitted by e-mail in seconds, thereby eliminating the need for paper copies and conventional mail delivery.

For more information, contact ***Christina Diersing*** *(christina.diersing@uc.edu), director of Human Resources Systems and Information Technology at the University of Cincinnati.*

Reflections, *continued from page 42*

able to go from campus to home to plane to Sri Lanka seamlessly. And we can't teach a course that makes effective use of wireless technology without an appropriate wireless device.

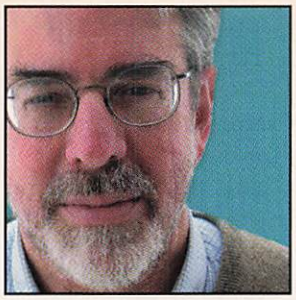
With these infrastructure requirements, we could have classes that really use the mobility of mobile devices. One small step in that direction would be to have distributed classes where some students would physically be in a classroom while others would be distributed to various action sites. Learning about pollution? Have some students locate different polluted sites and participate in the class on site like the evening news. "This is Sue reporting where toxic chemicals are pouring into the Crimea River."

At times there may be no one in the physical class at all. Studying Greek Revival architecture? Send students to different parts of a city to look for it. Have them share their findings with the class scattered across dozens of square miles of city during what would have been their class time—and beyond.

With wireless we do not need classrooms at all. Students do not need to come together in the same spot at the same time to learn. Classrooms are an unfortunate compromise on the best way to deliver education. They exist because we lacked the technology to have each student learn in the ever-changing way and place that suited each student best. The promise of wireless is a paradigm shift that would begin the extinction of classrooms, courses, and free learners to learn everywhere—no longer tethered to a classroom.

When our ATMs finally go away we will see a quantum leap in our ability to manage our money. Giving up classrooms will do the same for learning. We can just keep evolving wireless on campus and see some small improvements in education, or we can dare to think about real mobility in education and change the world. Extinction is only bad when you're a dinosaur.

Howard Strauss *(howard@princeston.edu) is the manager of technology strategy and outreach at Princeton University.*



Howard Strauss

REFLECTIONS

ANOTHER LOOK AT EDUCATION TECHNOLOGY

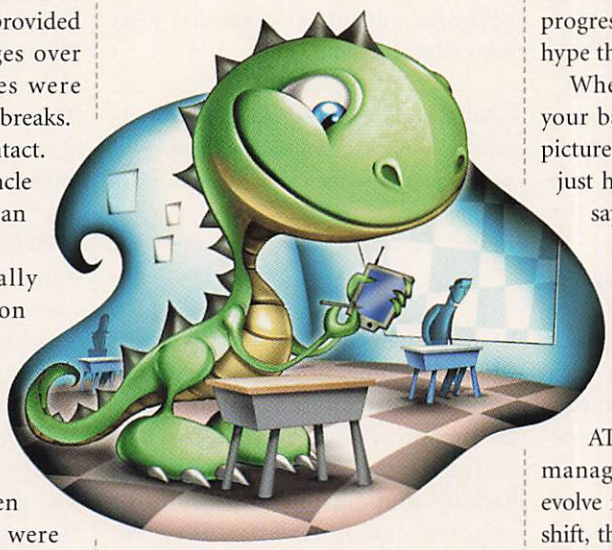
Wireless Classrooms: Evolution or Extinction?

Automatic Teller Machines initially appeared inside banks, right next to the human tellers they emulated. ATMs disbursed money and accepted deposits, but when banks closed for the day, ATMs were locked inside, as useful and accessible as the vacant teller cages they abutted. Locked inside a bank, ATMs provided a few evolutionary advantages over human tellers. Waiting lines were shorter and ATMs never took breaks. There was a loss of human contact. An ATM never asked about Uncle Larry's gout or suggested a loan for your daughter.

Wireless notebook initially appeared inside classrooms on the same laps that previously held paper notebooks or wired laptops. Wireless notebooks could be used to look things up and do classroom collaboration, but when class was over and students were out of range of wireless access points, wireless laptops were not much better than the paper or silicon solutions they superseded. Even limited to classrooms, wireless laptops had some evolutionary advantages, but these did not begin to exploit the possibilities of mobile intelligent devices. Unfortunately, the use of wireless laptops in classrooms reduced human contact and made it easier for students to ignore their teachers while they exchanged instant messages and searched the Web.

This evolutionary advance allowed around-the-clock access to one's money, but still required a visit to the bank. On the downside, a secluded ATM invited crime.

Eventually campuses discovered that wireless was more useful when it was also available outside classrooms. Students could continue to access information and collaborate in hallways, student centers, and under trees. Since the best way to collaborate on campus often was face to face, wireless access made it easier for students to avoid human contact.



Finally realizing that users just wanted their money. Banks began distributing ATMs to shopping malls, convenience stores, airports, and other places where people needed access to their money.

Unfortunately there is no analog to even this small evolutionary ATM advance in the use of wireless on campus. Students do not regularly bring their laptops to class because there is no compelling reason to do so. Wireless hasn't changed this. The mobility of wireless devices will allow a major paradigm shift in the delivery of education but we have only managed the tiny evolutionary equivalent of putting ATMs on the outside walls of banks. This is a useful bit of progress, but not worth the money or hype that wireless commands.

When you have $2,000 in a bank, your bank doesn't keep ten thousand pictures of Andrew Jackson for you. It just has a number on some disk that says you have $2,000. To use your money, your bank just needs to decrease your number and increase the numbers it keeps for Pizza Hut, Windsor Service Station, or Hyatt Hotels, for example. We have learned from ATMs that we don't need banks to manage our cash—as long as ATMs evolve rather than undergo a paradigm shift, they will still be teller-like objects that are small improvements over human tellers. A paradigm shift is very difficult because it involves extinction, not evolution of the old. Once we realize we are only moving bits, not pictures of presidents, this paradigm shift is possible and those old inconvenient ATMs go away. Then we can buy things with something we have with us anyway; a cell phone, cash card, watch, PDA, thumbprint, or whatever.

To make the paradigm shift with campus wireless possible—or even advance its evolution—wireless must be ubiquitous and seamless. Wireless devices need to work, not just on campus, but globally, and they must be

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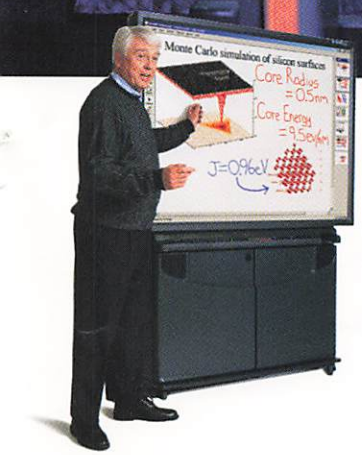

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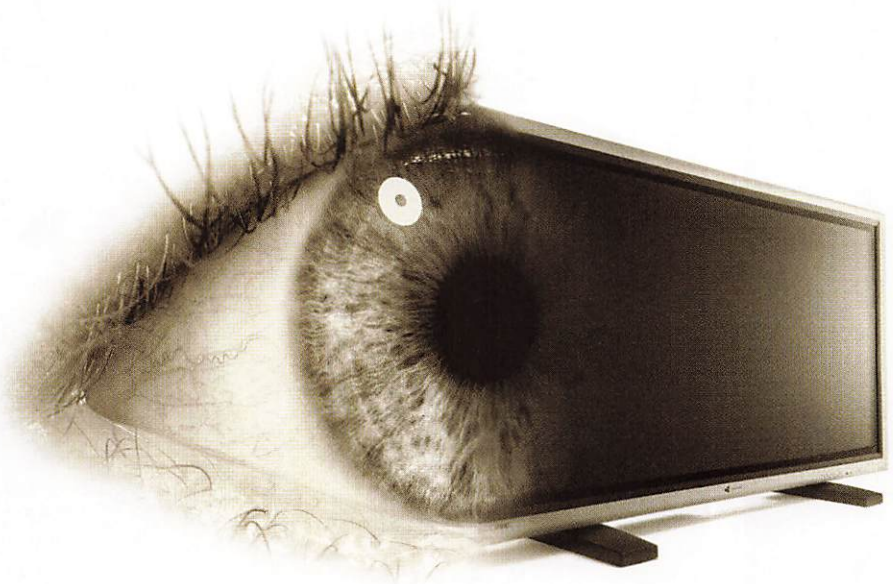
HUMANOLOGY



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